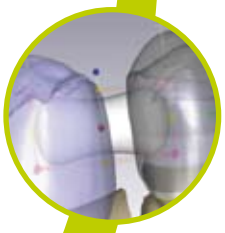
straumann

USER MANUAL

etkon™_visual 4.6



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1. FOREWORD

The **etkon™ system es1** is a CADCAM system for use in dental laboratories. The system supports the dental technician in acquiring very accurate digital data on the jaw and die, in modeling corresponding frameworks and transferring automatically generated milling information to Straumann CADCAM GmbH via Internet connection. The frameworks are fabricated at Straumann CADCAM GmbH out of the material defined by the dental technician. After a thorough quality inspection, the finished frameworks are sent to the dental lab directly by express delivery.

Purpose of this manual

This manual is directed primarily to users of the **etkon™ system es1** who already have initial experience with the system and are now looking for more detailed information on certain topics, for example scanning wax-ups, bite registrations or wax matrices.

Furthermore, the project workflows are explained in this manual, including the workflow for producing primary crowns, inlay shells or even inlay bridges, veneer bridges and also all-metal bridges. The manual is a valuable aid for producing high quality dental restorations.

2. GETTING STARTED

2.1 Starting the system

Step 1
1. Switch the scanner on by pressing the switch on the back.
2. Switch the monitor on.
3. Switch the computer on.

Step 2
After the system has booted, the log-in dialog is displayed.

Enter your access data.

User name: etscan
Password: etscan

Note
Do not make any changes in the **Session Type** box.

Step 3
etkon™_visual starts automatically at system start.

Alternatively, you can also double click on the **etkon™_visual** icon.

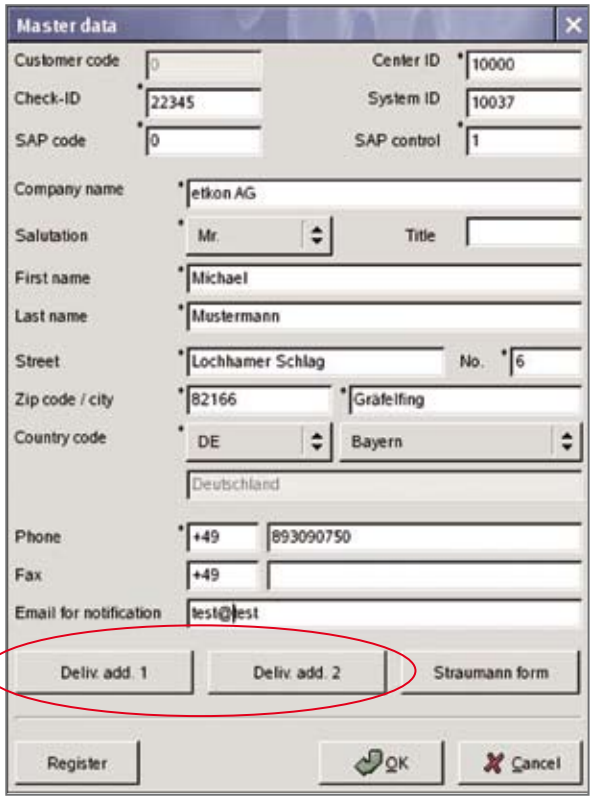
3. USER-SPECIFIC SETTINGS OF ETKON™_VISUAL

3.1 Determining master data and delivery addresses

Click on **Extras > Master data** in the menu bar.

Here you can save further delivery addresses.

Click on either **Delivery address 1** or **Delivery address 2**.



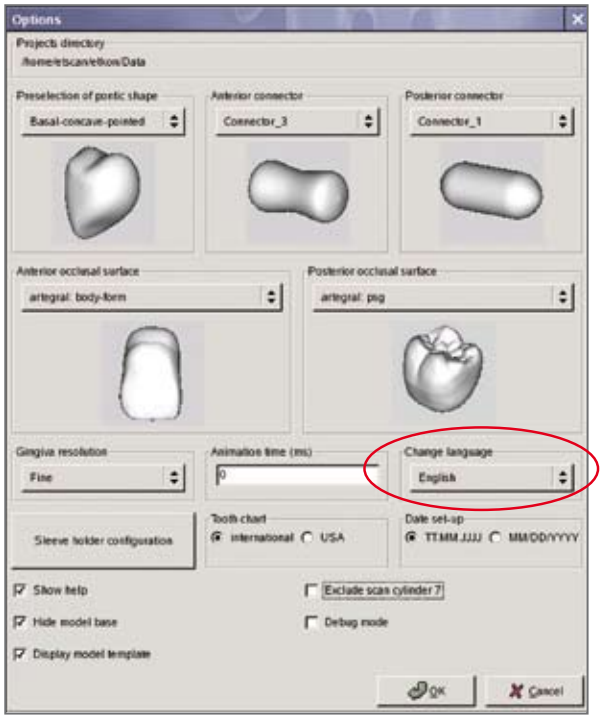
Note
Please change only your address data. All the fields marked with an asterisk have to be completed, since our logistics company requires all these data. Should the numbers in the upper part of the window be missing, they will be entered by your regional Straumann® sales manager or Straumann® customer support. The master data are preconfigured if all the data are known at the time of purchase.

A further entry window opens in which you can enter the corresponding address data. Please enter your personal delivery address into **Delivery address 1.**

Confirm the entry at the end with **OK.**

3.2 Language and animation time

Click on **Extras > Options** in the menu bar.

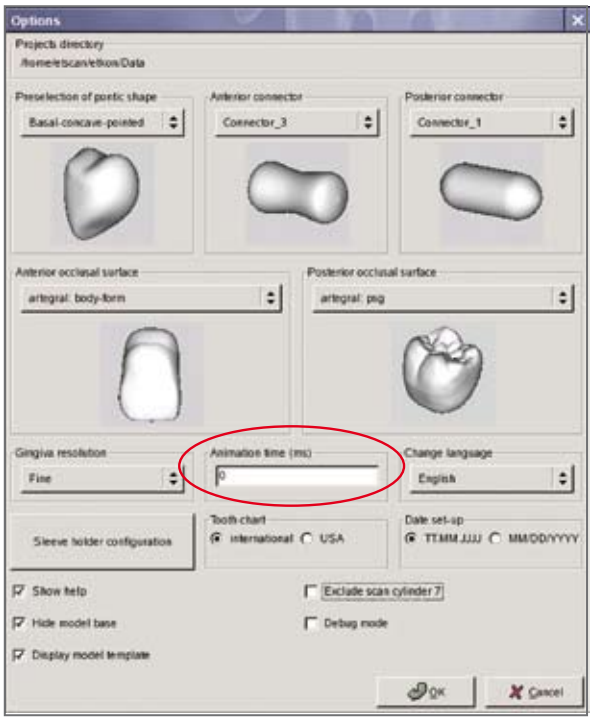


Change language
Here you can define the relevant language of etkon™_visual.

Confirm the entry with **OK**.

Animation time
The animation time for centering the selected object during designing can be defined in milliseconds.

Setting "0" means that no delay takes place in centering the object.



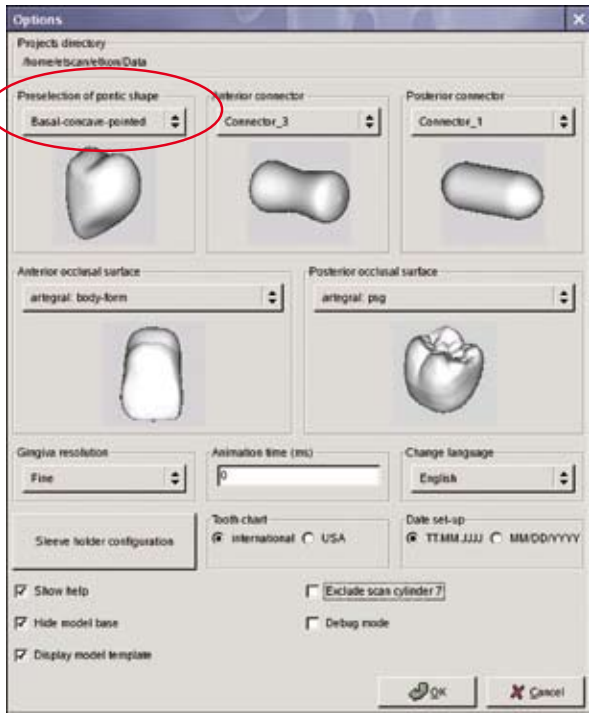
Confirm the entry with **OK**.

3.3 Pontic presettings and gingiva resolution

Pontic presettings

Here you can determine the basic shape for the pontics.

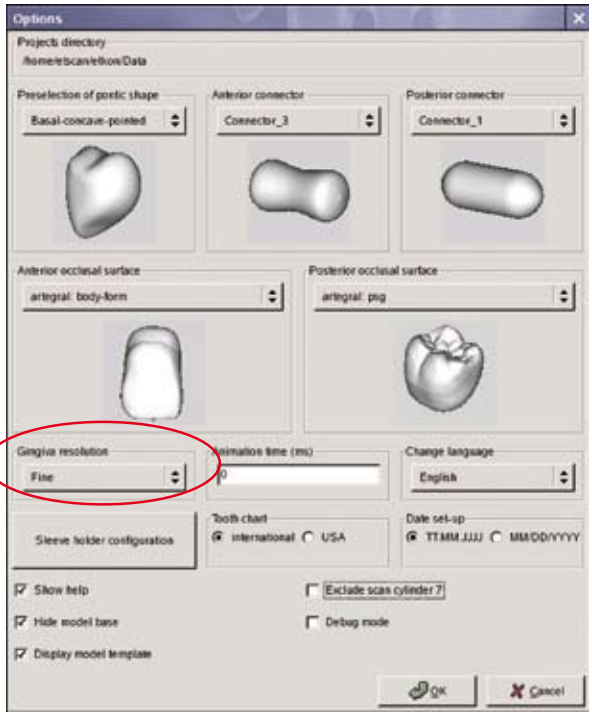
Confirm the entry with **OK**.



Gingiva resolution

Here you can define the resolution for the display of the alveolar ridge.

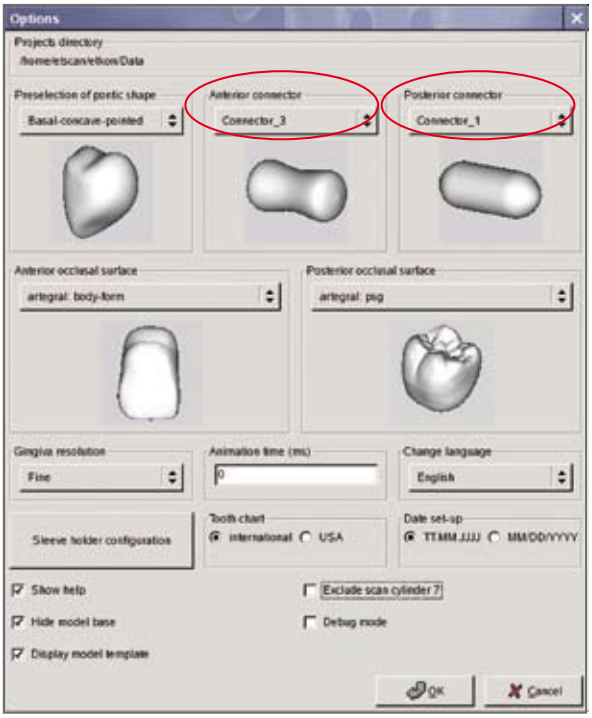
Confirm the entry with **OK**.



3.4 Anterior and posterior connectors

Anterior connector

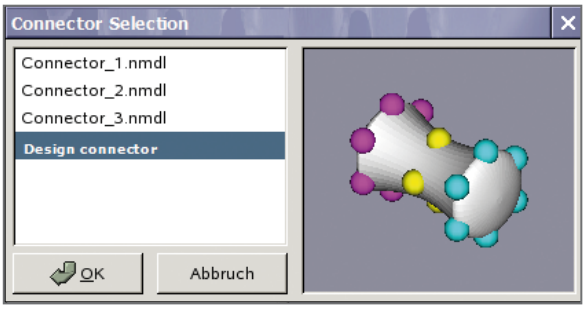
Here you can preset the default connector shape in the anterior region. An additional connector, called design connector, is available. It is divided into three sections which can be modified independently from each other.



Posterior connector

Here you can preset the default connector shape in the posterior region in the same way as described above for anterior connectors.

You can choose between four different connector shapes.



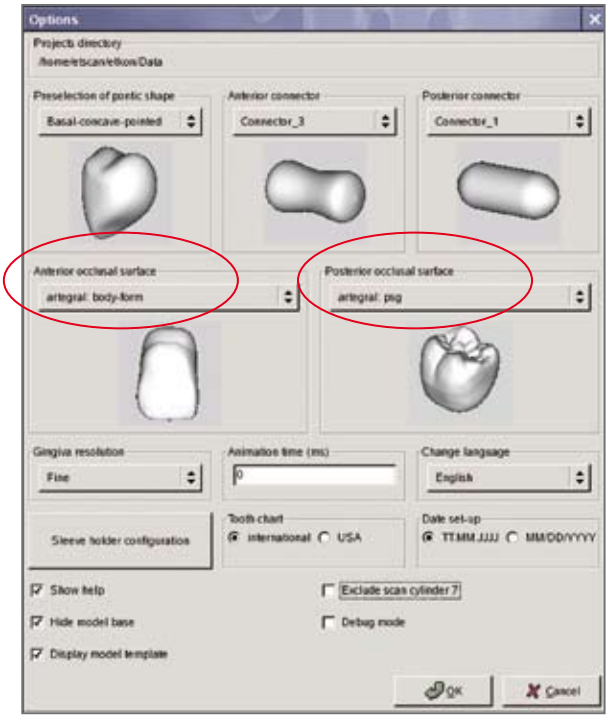
Confirm the entries with **OK**.

3.5 Anterior and posterior tooth database

Anterior tooth database
Here you can preset the default tooth shape in the anterior region.

Posterior tooth database
Here you can preset the default tooth shape in the posterior region.

Confirm the entries with **OK**.

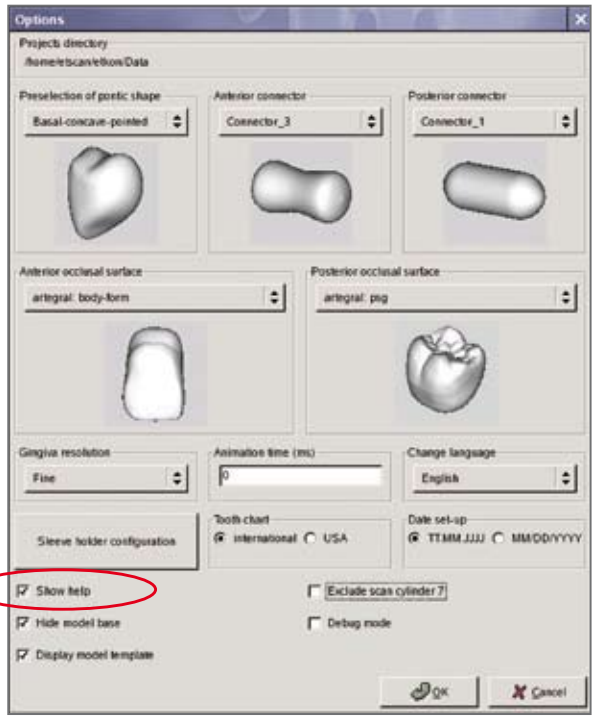


3.6 Help picture and tooth chart

Help picture in the Scan Manager
Here you can determine whether or not you want to see the help picture in the Scan Manager.

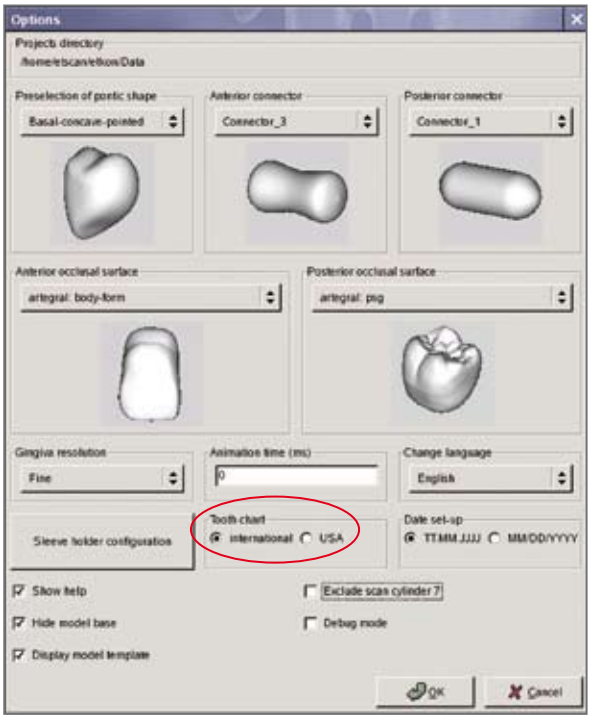
The help picture is a reminder of the important rules for positioning dies and models inside the scanner.

Confirm the entry with **OK**.



Tooth chart
Select either **international** or **USA.**

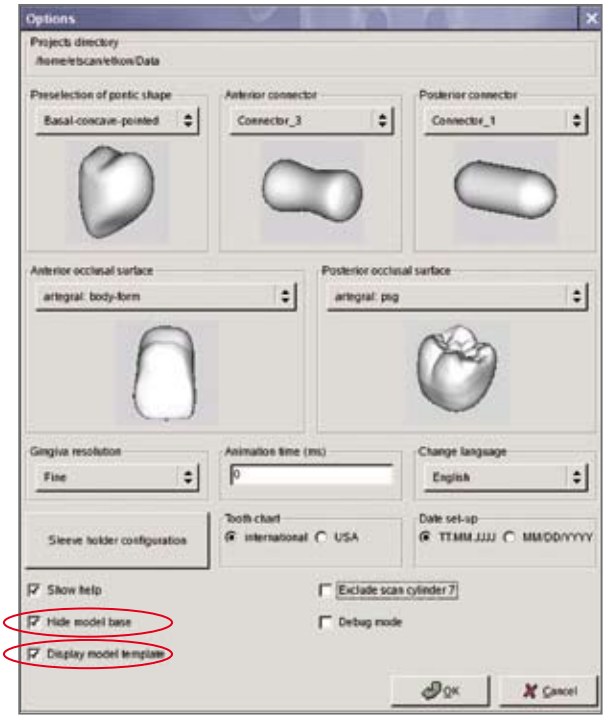
Confirm the entry with **OK**.



3.7 Model base and model template

Here you can define whether you want to see the model base and model template or not.

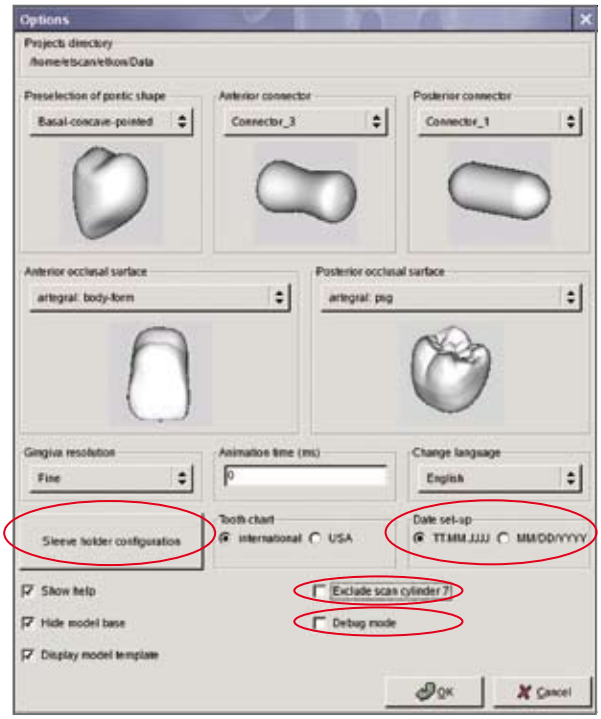
Confirm the entries with **OK**.



3.8 Date set-up

You can choose between two different date formats.

Confirm the entry with **OK**.



3.9 Sleeve holder configuration and Exclude scan cylinder 7

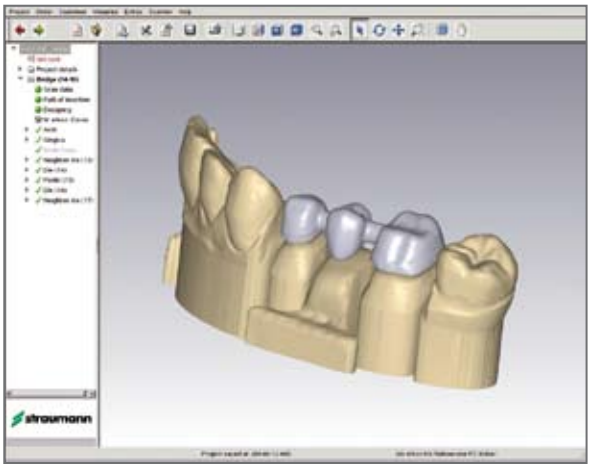
See chapter 6.9 (Straumann® CADCAM abutments).

3.10 Debug mode

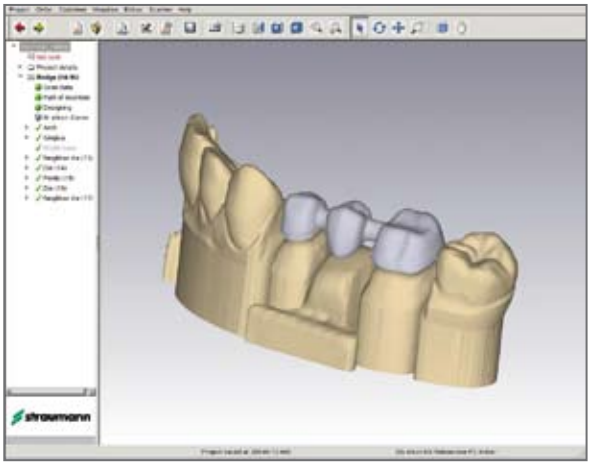
Only to be used by Straumann® support.

3.11 Highlights

Click on **Visualize > Show highlights** in the menu to switch the highlights effect on or off.

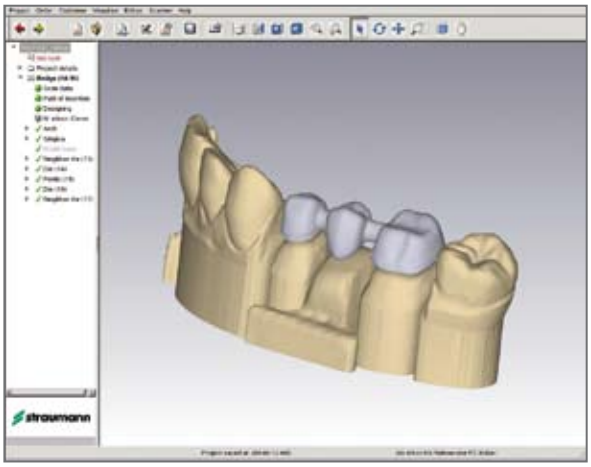


To deactivate this display click again in the menu bar on **Visualize > Show highlights**.

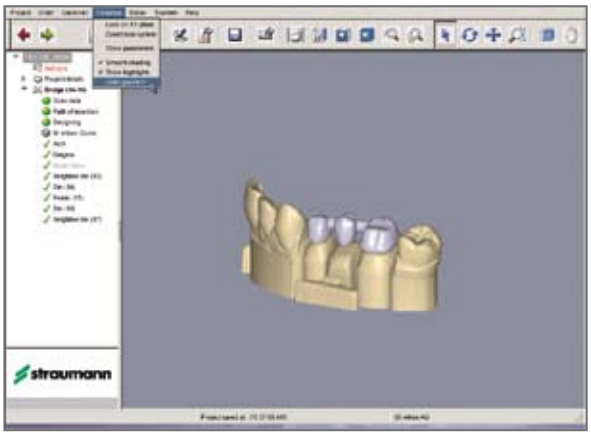


3.12 Color gradient

With the color gradient in the background of etkon™_visual the spatial display is improved.



To deactivate this display click in the menu bar on **Visualize > Color gradient**.



3.13 Sending screenshot by e-mail

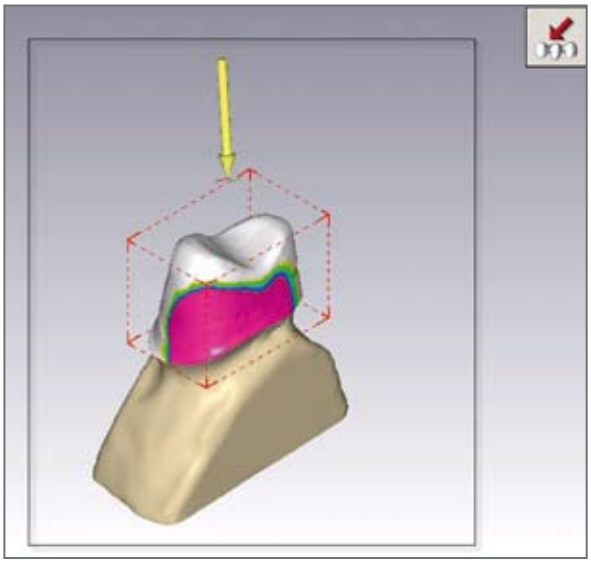
Step 1
If you want to send the current image on the screen as an e-mail attachment, click on the **E-mail** icon.

Note
The e-mail address is not preconfigured. If you would like to have an e-mail address, please contact your local Straumann® support. You can only use this feature if the field **E-mail address** in the customer database entry connected with the current project is filled in.

Step 2
Click **Yes** to take a screenshot.

Step 3

Drag the cursor over the desired area of the graphic while holding down the left mouse button to take the screenshot.



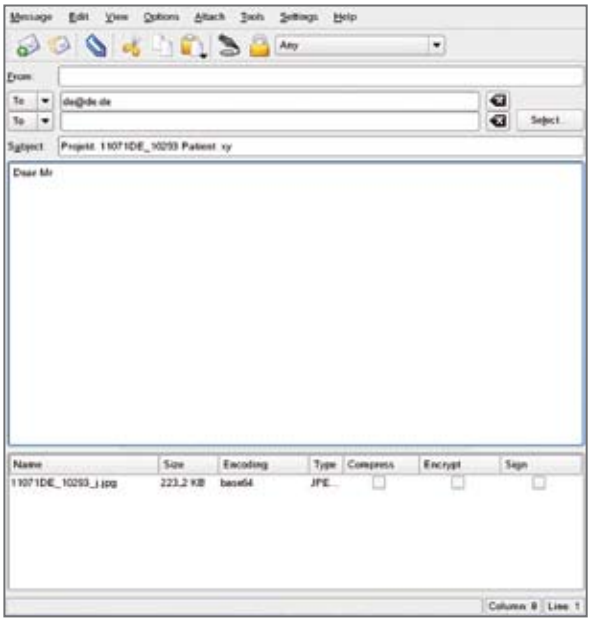
Step 4

The e-mail window is displayed.

The default recipient is the e-mail address in the customer data connected with the current project. However, it is possible to edit the e-mail address.

You can also add a message to the e-mail.

The patient reference as well as the associated project number are entered automatically in the reference field.



4. FUNCTIONS OF ETKON™_VISUAL

etkon™_visual offers numerous functions to design dental restorations quickly and without special prior knowledge.

Different functions are available in etkon™_visual during the individual steps of the workflow (scanning, visualizing, modeling).

All the main functions for designing dental restorations can be reached through a single toolbar.

Further functions and options for special indications are available in an additional menu bar.

Access to functions is via three toolbars:

- Project
- Single view
- Modeling

4.1 Project toolbar

Icon	Name	Function
	Back	Loads the preceding activity in the workflow. Changes e.g. from **Modeling** back to **Path of insertion**.
	Next	Loads the next activity in the workflow. Changes e.g. from **Secondary path of insertion** to **Die path of insertion**.
	Create new project	Creation of a new project. The current project is saved automatically.
	Add order	Adds new orders (copings, bridges, etc.) to the current project.
	Open Scan Manager	Displays the dialog for scanning the parts of the projects.
	Save project	Saves the current project status.
	Send project	Sends finalized projects to Straumann CADCAM GmbH via Straumann.
	Load project	Loads a saved project. The current project is saved automatically.
	Send e-mail	Displays the window for sending e-mails.
	Show path of insertion	Shows the object from occlusal and the alignment of the framework in relation to the dies.
	Side view	Displays the object in the view from the left.

Icon	Name	Function
	Front view	Displays the front of the object.
	Isometry	Shows the object in isometric projection.
	Zoom on model	Displays the object in the full image.
	Zoom selection	Magnifies the selected region.
	Selection mode	Activates the cursor for selecting single objects or details.
	Rotation mode	Activates rotation mode. In the rotation mode the displayed object can be rotated (about the central axis of the window) by clicking with the left mouse button or by rolling the mouse wheel. To view this more accurately, you can alternatively move the mouse with the mouse wheel pressed to rotate the object on the screen.
	Move object	Activates the shift mode. In the shift mode the object can be moved to the left/right/up/down with the cursor with the left mouse button pressed.
	Zoom mode	Activates zoom mode. In the zoom mode the display of the object can be magnified/reduced in size by up/down movement of the cursor with left mouse button pressed.
	Construction dimensions	Displays the dimensions of the object, as well as the Z optimization of the design.
	Display model template	Displays the model in relation to the template.

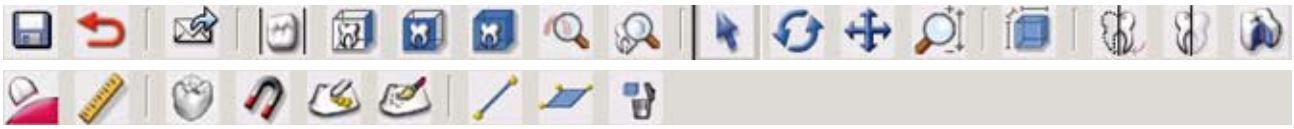
4.2 Single view toolbar (horizontal)

Icon	Name	Function
	Enlarge window	Enlarges the window.
	Reduce window	Reduces the window.
	Show previous objects	Displays the previously scanned single object of the project.
	Show next object	Displays the next scanned single object of the project.
	Close holes	Closes all holes of the die.
	Smooth margins	Jagged margins can be smoothed by this (this function is recommended only for inlays).
	Path of insertion	See "Project toolbar"
	Buccal view	Displays the object from the buccal view.
	Activate toolbar	Shows and hides the toolbar on the left side.
	Rotation mode	See "Project toolbar"
	Move object	See "Project toolbar"
	Zoom mode	See "Project toolbar"
	Transparent	Shows a transparent display of the die.
	Display scan cylinder	Displays the scanned object with the Scan cylinder to simplify the detection of scanning errors.
	Display scan data	Displays all scanned points of the object.

4.3 Single view toolbar (vertical)

Icon	Name	Function
	Selection brush	Activates brush. The preparation surface can be marked roughly with the brush. Keep the left mouse button pressed.
	Selection polygon	Activates selection polygon. A preparation region can also be marked with the selection polygon.
	Line selection	Determines the course of a preparation line for inlays and onlays: shortest path or course with the greatest curvatures.
	Create spline	Manual determination of the preparation line.
	Edit preparation line	Edits the preparation line.
	Expand selected area	Expands the selected area.
	Reduce selected area	Corresponds to an eraser to remove too many marked regions.
	Invert selection	Inverts the selection. Surplus regions are marked blue.
	Deselect all	Cancels the marking of selected areas.
	Delete selection	Deletes the blue areas.
	Conversion of the selection to Maryland/inlay	Converts the selected region into a preparation region for Maryland or inlay.
	3 point match	Manual referencing of bite registrations and wax matrices .
	Undo last cut	Recalls the last cut.

4.4 Modeling toolbar



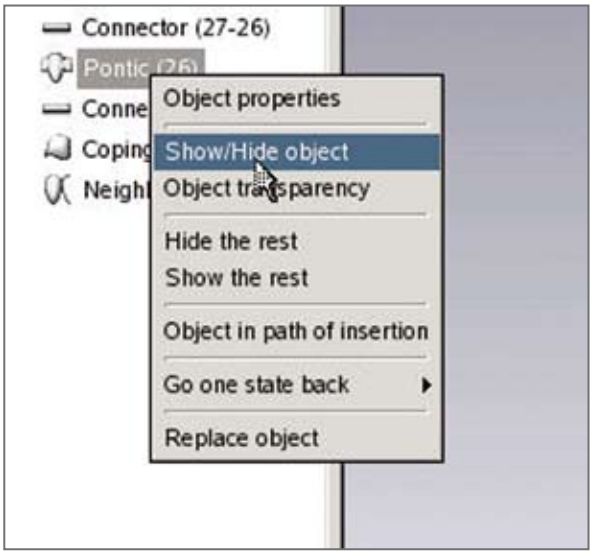
Icon	Name	Function
Some of the icons are identical with those of the project toolbar.		
	Undo	Restores the last three saved states.
	Sectional view	Displays the selected object with a quarter section. By clicking on this button again, the next quarter is removed (object must still be activated).
	Substract gingiva	Displays a dialog for entering the distance between the basal surface of the pontic and the alveolar ridge (in mm).
	Wax-up tool	Displays a dialog for determining the shape, strength and radius of the Wax-up tool. To build up a segment click with the right mouse button on the desired point.
	Tape measure	Measures objects. Click the left mouse button on the start and end points of the object. The measured length is displayed in the bar below.
	Wax knife	Individual modeling of copings.
	Smoothing tool	Smoothes the object surface.
	Occlusal surface	Creates an occlusal surface on the selected coping or pontic.
	Transparency	Apart from the selected tooth, all other teeth are visualized with a transparency of 20 %.
	Help line	Produces help line for simplifying modeling.
	Help plane	Produces help plane for simplifying modeling.
	Delete help object	Deletes the selected help line or plane.

4.5 Hiding objects and displaying them transparently

Show/Hide object

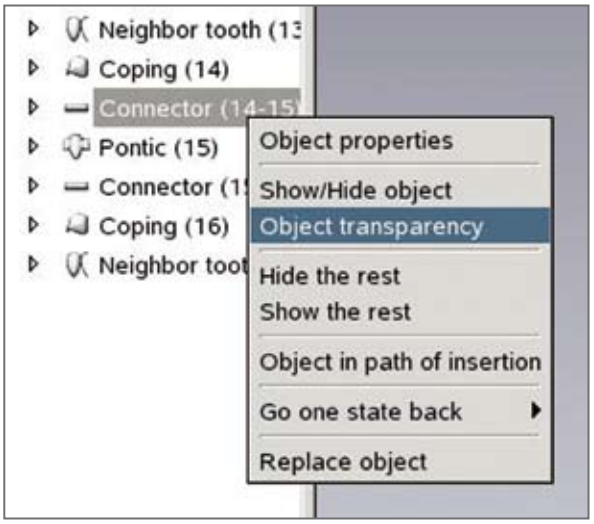
To display and hide objects double-click on the desired object in the feature tree.

Alternatively, right click on the corresponding object in the feature tree.



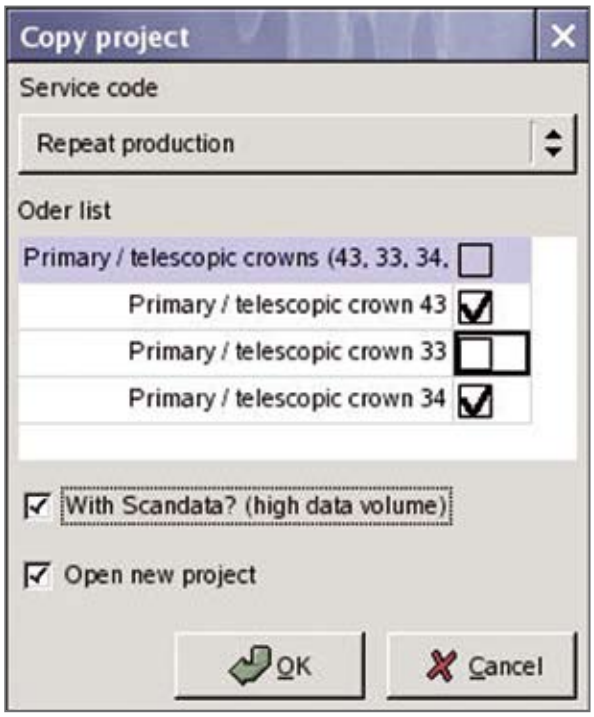
Transparency

Right click on the corresponding object in the feature tree and select **Object transparency**.



4.6 Copying project

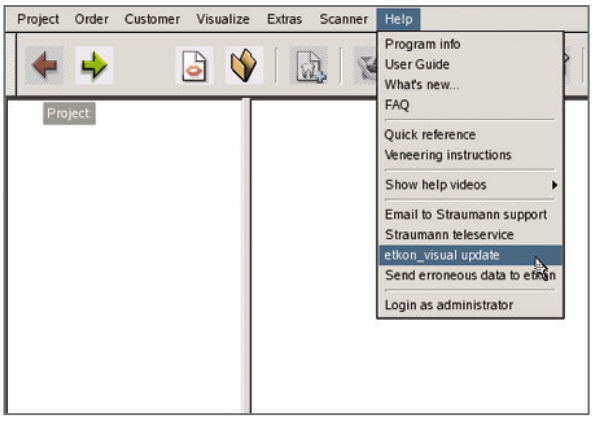
When you use the **Copy project** function you can either copy the whole project or only selected objects.



4.7 Updating etkon™_visual software

Click in the menu bar on **Help > etkon™_visual update**.

Confirm the following question with **Yes**.



5. WORKFLOW IN ETKON™_VISUAL

5.1 Scanning in detail

To start a scan, you must first enter the master data as well as the order data belonging to the project.

What can be scanned?
The following can be scanned with the etkon™ es1 system:

- complete model
- up to seven dies simultaneously (if more than 7 dies have to be scanned, the scan is divided automatically into several scans)
- neighboring teeth
- bite registrations
- wax matrices
- dies with knife-edge, shoulder, chamfer and inlay preparation, according to indication
- wax-ups
- abutments

For copings you only have to scan the associated dies.

For modeling bridges you must scan the following:

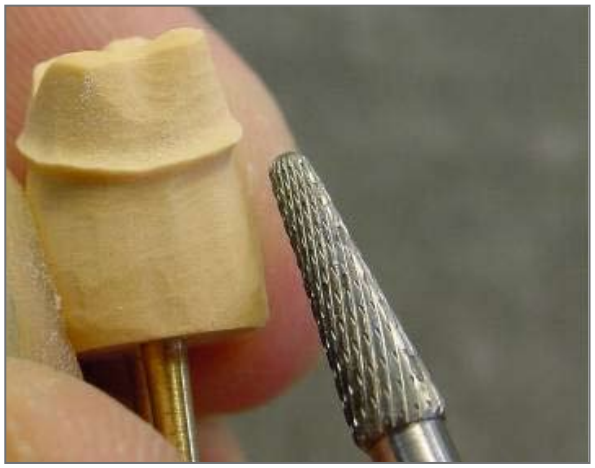
1. the model
2. the associated dies and, if required, the neighboring teeth
3. if necessary, a corresponding bite registration or wax matrix

5.2 Requirements of the cut model

The following conditions should be fulfilled:

1. Approved **preparation types:**
   - Knife-edge preparation
   - Shoulder preparation
   - Chamfer preparation
   - Inlay preparation

2. The **preparation margins** must be completely visible.



Note
For automatic detection of the preparation line the die must be clearly chamfered underneath the preparation line.

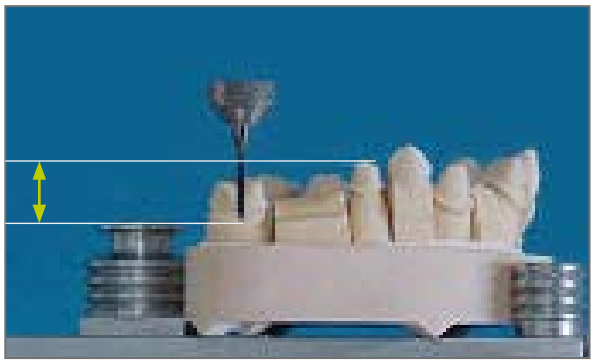
3. Each die must be **removable**.

4. The **surface** of the dies should have the following features:
   - matt, non-reflecting surface
   - homogeneous color gradient

   Untreated plaster has been proven to be suitable.

5. The **design height** must not exceed the material-specific blank height.

Note
The design height can be checked and compared to the blank height at any time by clicking on the **Construction dimensions** icon.



Design height

5.3 Scan Manager

The scan is started and controlled by the Scan Manager.

Note

Before starting the scan the following conditions should be met:

- The plaster model meets the requirements described in chapter 5.2.
- The scanner is switched on. The scanner lid is closed.
- Suitable order data has been entered for the project.

Note

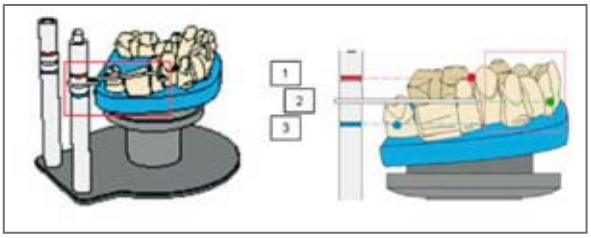
The Scan Manager starts after a project is created.

5.3.1 Rules for scanning models

Please perform the following steps before starting the scanning processes:

Step 1

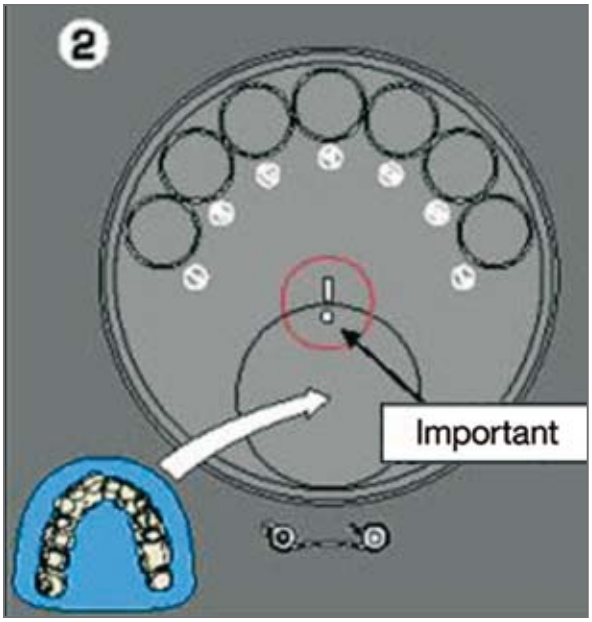
Use the setup aid for aligning the model. All preparation lines must be on one plane with the metal rod (2).
In more complex situations, make sure that the vestibular part of the preparation lines for all dies is in the area between the red (1) and the blue (3) line. Check this with the aid of the metal rod on the setup aid.



Step 2

Open the scanner lid and rotate the model plate until it snaps into position.

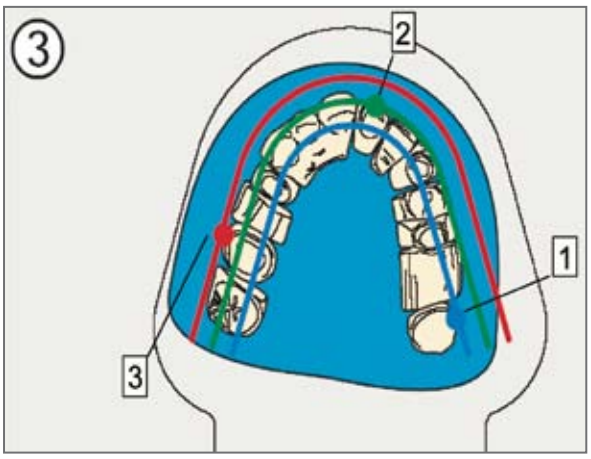
The white dot must be aligned with the white line.



Step 3

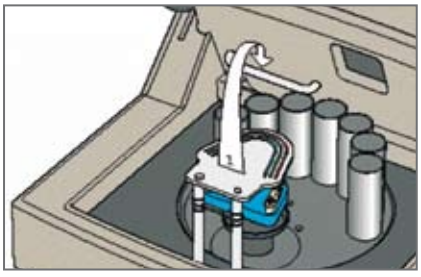
Place the model on the small plate in the scanner. Use the acrylic template to find the optimum position for the model. The model should be aligned according to the following criteria:

- If the preparation lines were aligned with the red mark, the vestibular cusps or the incisal edges must be in the area of the red line.
- If the preparations lines were aligned with the metal rod, the vestibular cusps or the incisal edges must be in the area of the green line.
- If the preparation lines were aligned with the blue mark, the vestibular cusps or the incisal edges must be in the area of the blue line.



Note

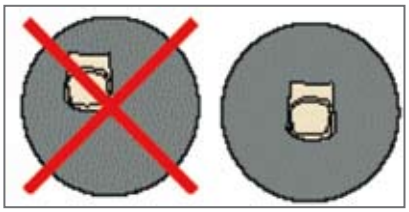
The template should be removed from the scanner before starting the scan.



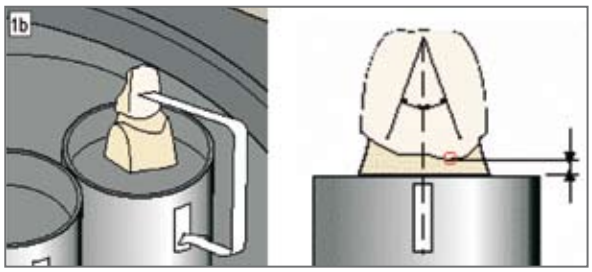
5.3.2 Rules for scanning single dies

Each die should be positioned as follows:

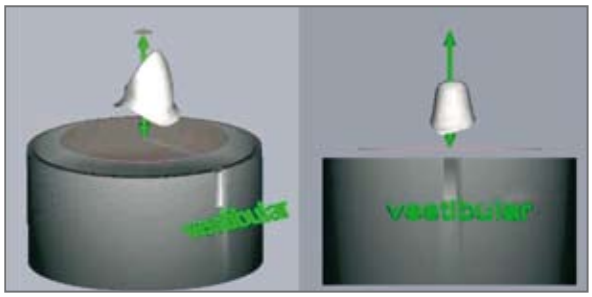
- centrally



- preparation line (PL) at least 1 mm above the edge of the Scan cylinder



- vestibular side aligned with the white mark on the Scan cylinder



Step 4
Close the scanner and click on the **Next** icon.

Step 5
The progress of the scan is displayed in the **Scan Manager** window if you click on **Details**.

5.3.3 Rules for scanning bite registrations

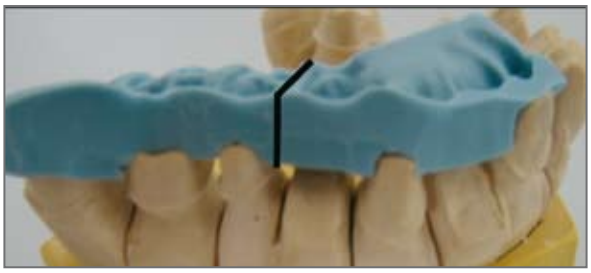
Step 1
Please prepare the bite registration according to the following criteria.

The bite registration should be reduced to minimum size:

- Reduce the vestibular and oral sides so that at least half of the vestibular side of the dies is still visible.
- The basal part should be reduced until the bite registration is fixed to the occlusal/vestibular edge of the dies.
- The bite registration must be cut into single parts with a maximum length of 25 mm so that it fits into the Scan cylinder.
- The cut surfaces of the individual parts should be marked with a black pen.

Note

The preparation line must be visible on the vestibular side.



Step 2

Create a new order:

1. Select material, color and order type as **Bridge**.
2. Click on all abutment teeth in the dental arch and define these as **Coping**.
3. Now click on all pontics and define these as **Pontic**.
4. Select the copings and pontics once again and define them as **Bite registration**. A maximum of three objects per registration can be defined as **Bite registration**.

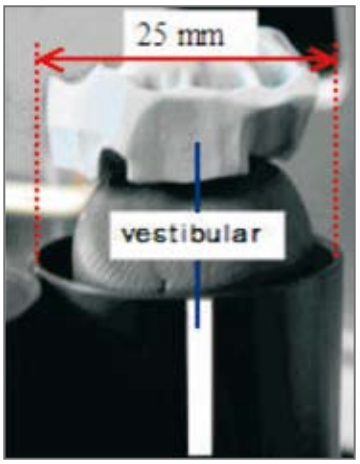
Step 3

Scan the entire model with bite registration(s). In our example two bite registrations were used. Follow the instructions of the Scan Manager.

Note

Tilt the model slightly towards the vestibular side so that the scanner can acquire the occlusal part of the bite registration.

Step 4
Scan the model **without** the bite registration. Simply remove the bite registration from the model for this purpose, rotate the model plate again so that the white dot is aligned with the white line and magnetized. The model does **not** have to be aligned anew.



Positioning the bite registration in the Scan cylinder
Position the bite registration in the Scan cylinder as indicated by the Scan Manager:

- Each section ot the bite registration must be placed in the centre of the Scan cylinder.
- The vestibular side must be aligned with the white line.
- Each part of the bite registration must be completely visible.

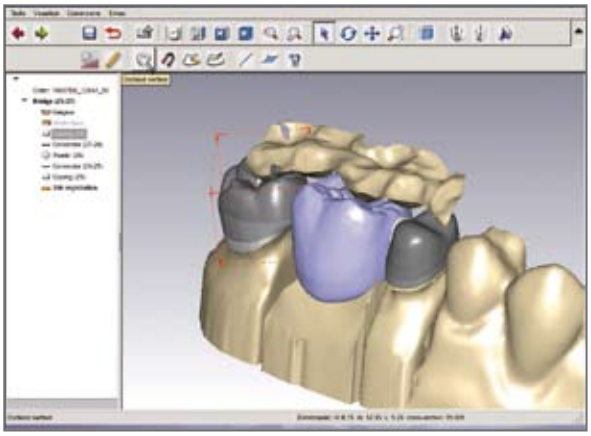
Note
The order in which the bite registrations are positioned in the cylinders is not important. The Scan Manager references the parts of the bite registration automatically to the model.

Step 5
Scan the individual dies.

Follow the instructions of the Scan Manager.

Step 6
The scan is completed and the Scan Manager is closed automatically.

You then see the scanned objects on the screen.



Note
The bite registration can be edited in the single view.

5.3.4 Rules for scanning wax matrices

Step 1

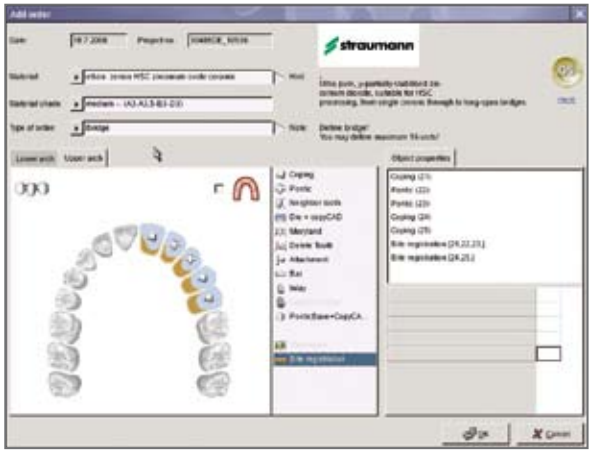
Prepare the wax matrices according to the following criteria:

- To scan a wax matrix a scannable surface is required.
- We recommend Aqua Spacer[1] for covering plastic teeth, wax or similar reflecting materials.

Step 2

Create the project:

1. Select material, color and order type as **Bridge**.
2. Click on all abutment teeth in the dental arch and define as **Coping**.
3. Now click on all pontics and define as **Pontic**.
4. Select the copings and pontics once again and define them as **Wax matrix**. Define a maximum of three objects as **Wax matrix**. It is only possible to define a maximum of three objects per wax matrix.



Step 3

Scan the entire model with the wax matrices.

Note

Wax matrices longer than 25 mm must be separated.

[1] Aqua Spacer is a brand of al dente, dentalprodukte, Dieselstrasse 20, 88074 Meckenbeuren, Germany

Step 4
Scan the model without wax matrix. Simply remove the wax matrix from the model and rotate the model plate again so that the white dot is aligned with the white line and magnetized. The model does not have to be aligned anew.

Positioning the wax matrix in the Scan cylinder
Position the wax matrix in the cylinder as indicated by the Scan Manager.

Observe the following criteria:

- No part of the wax matrix may be longer than 25 mm.
- Each part should be placed in the center of the Scan cylinder. The vestibular side should be aligned with the white line.
- Each part of the wax matrix should be completely visible.

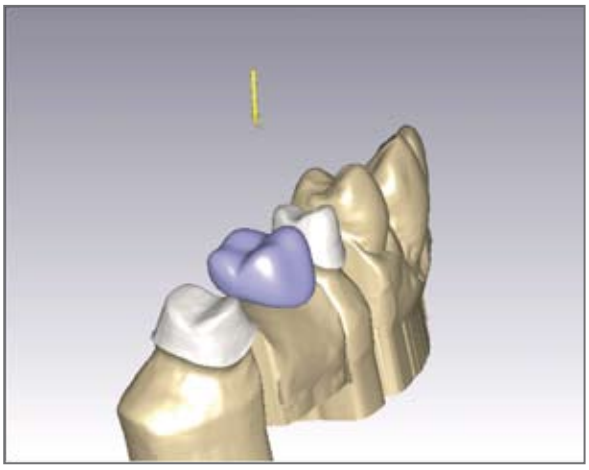
Note
The order in which the wax matrices are positioned in the Scan cylinders is not important. The Scan Manager assigns the parts of the wax matrix automatically to the model.

Step 5
Follow the instructions of the Scan Manager.

Step 6
The scan is completed and the Scan Manager closes automatically.

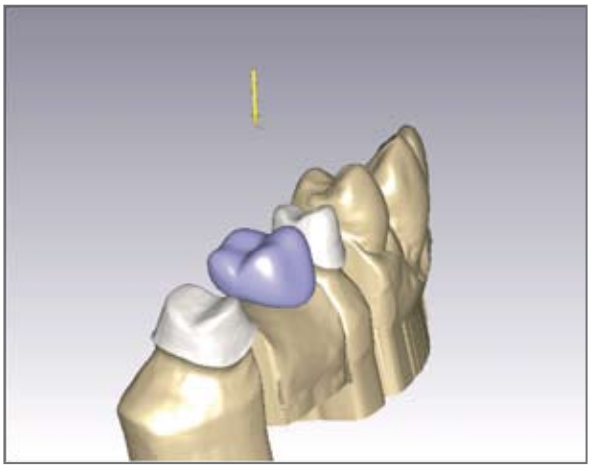
The scanned object will appear on the screen.

It is now possible to edit the wax matrix in the single view.



5.4 Defining the path of insertion

You can determine the path of insertion with etkon™_visual. The software automatically detects all undercuts and indicates their depth. The undercuts can be optimized and blocked out.



Note
The yellow arrow indicates the path of insertion.

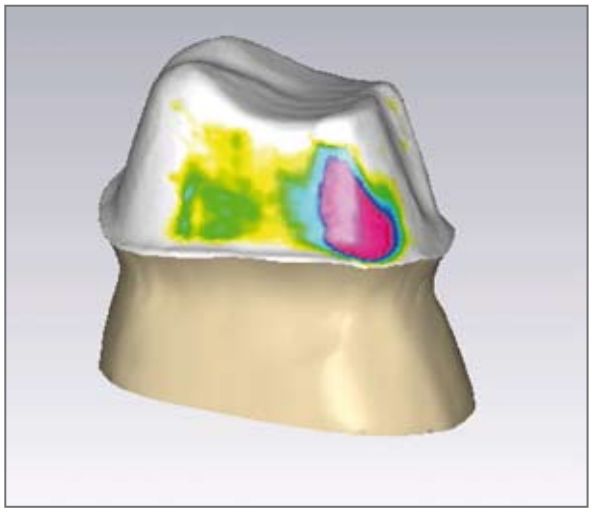
Step 1
Click on the **Next** icon.

Step 2
Click on the **Path of insertion** icon.

Step 3
Click on the **Calculate path of insertion** icon.

You now see the object in the path of insertion. If the preparation margin is not visible from this perspective, it is likely that an undercut is present.

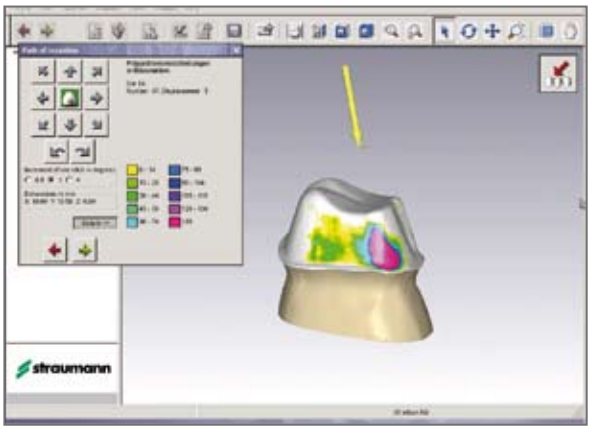
To view this more accurately, keep the mouse wheel pressed and move the mouse to rotate the object on the screen.



Step 4
If areas are marked in color directly at the preparation line, blocking out would result in an open margin.

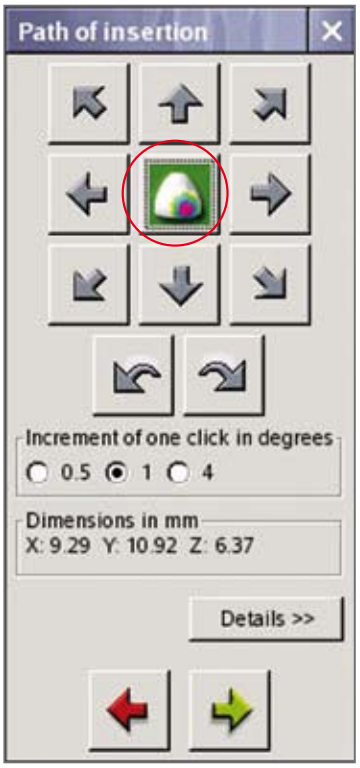
In order to determine the severity of the undercut, click on the **Details** button.

The value of the shift in the marginal region is given in micrometers (µm). The color scale indicates the general undercuts.



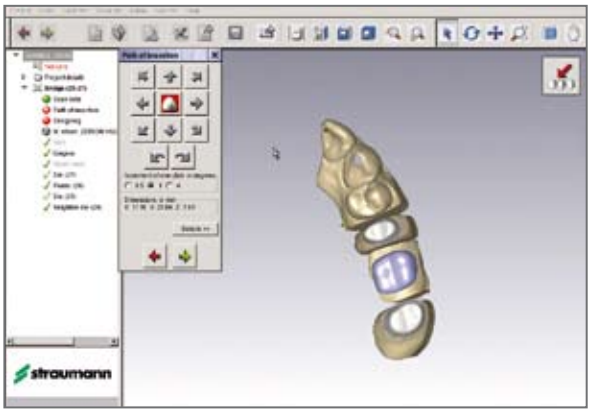
Step 5
1. Display the occlusal view.
2. To optimize the existing undercuts you can correct the path of insertion by clicking on the arrow icons.

Correcting the path of insertion is possible exclusively by using these arrows.



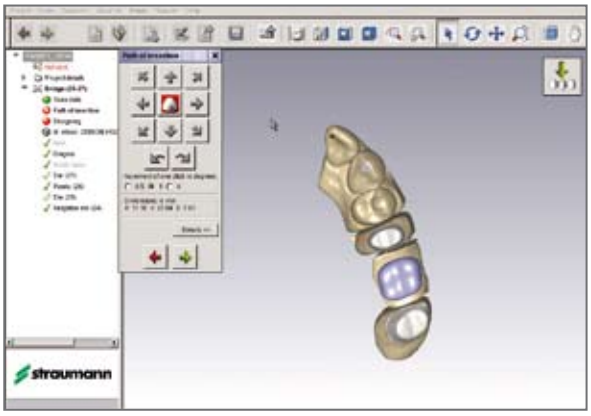
For better orientation the current status of the model position is displayed for calculating the path of insertion.

Red arrow display
The red mark indicates that the display on the screen does not correspond with the current path of insertion.

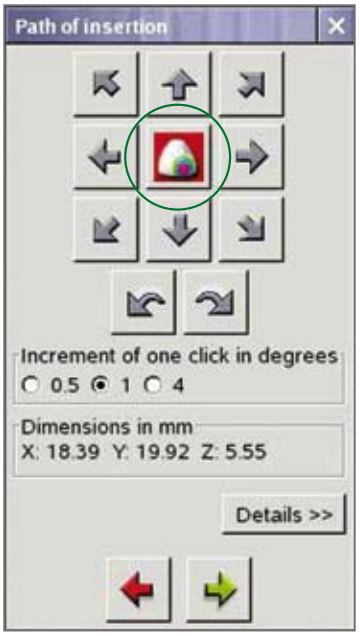


Green arrow display

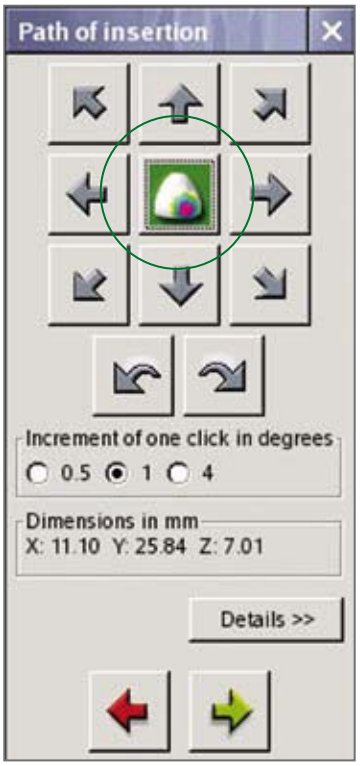
The green mark indicates that the display on the screen corresponds to the current path of insertion.



3. The undercuts are calculated for the new path of insertion by clicking on the red button marked in the picture.



The color of the icon changes from **red** to **green**, which means that the new path of insertion has been calculated.



4. Check the undercuts again (see Step 3).

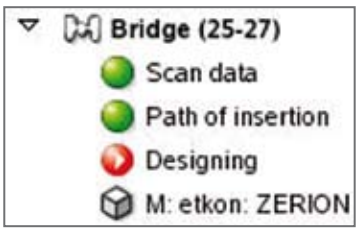
When you have found the optimum path of insertion, click on the **Next** icon.

5.5 Design the framework

You can start designing after you have defined the path of insertion.

Note
You can see from the feature tree whether the activity for defining the insertion direction is completed or not.

- Red means that the activity is not yet completed.
- Green means that the activity is completed.



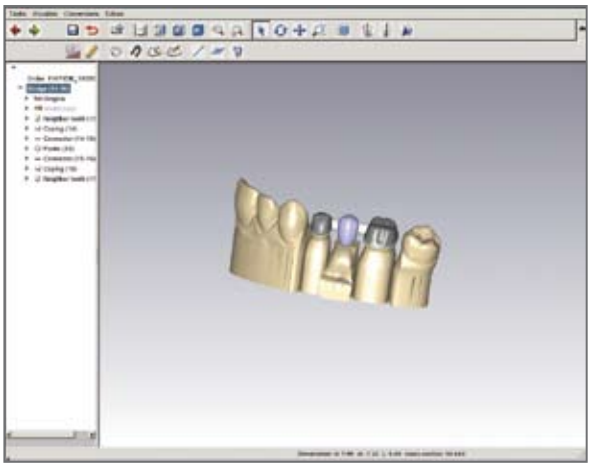
Step 1
Click on the **Next** icon.

The screen changes to the designing mode.

Further tools such as the Wax-up tool and a calculation tool for a uniform reduction of the pontic from the alveolar ridge are available.

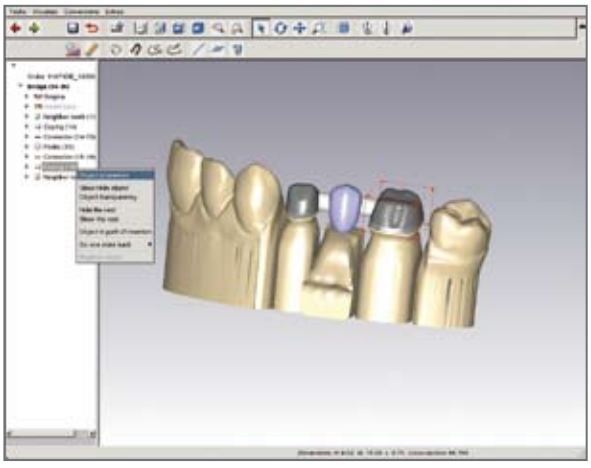
Designing objects
If you want to change parameters such as the cement gap or die spacer, you should do this at the start of designing.

⚠ Caution
The new calculation of parameters will reset the current design to the default design.



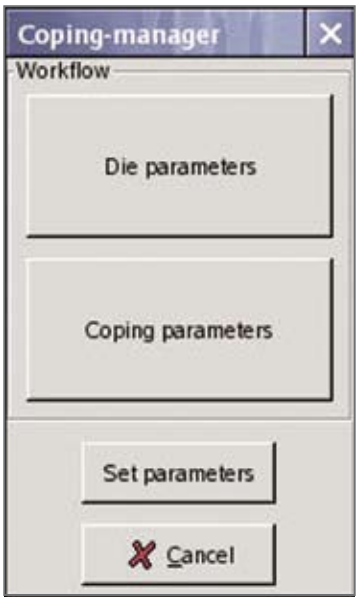
Step 2
Check the parameters and change them if necessary.

Right click on the coping in the feature tree or directly on the object and then select **Object properties**.



The **Coping-manager** dialog is displayed.

Click on **Die parameters**.



The standard settings are displayed for:

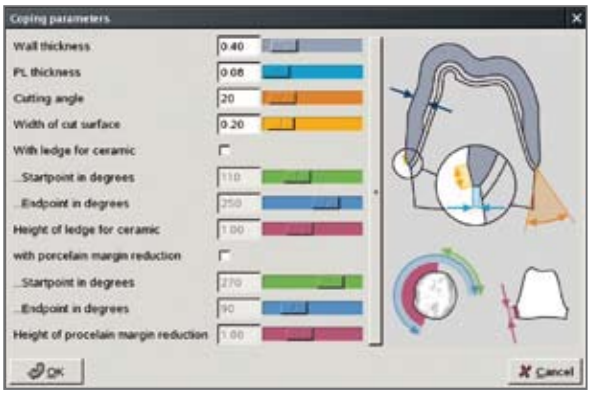
- Cement gap
- Die spacer
- Beginning of spacer above PL (preparation line)
- Correction of milling radius

On the right side there is a diagram that shows you the area of influence of all parameters.

To change the parameters simply move the corresponding slider.

Confirm the changes with **OK**.

The **Coping-manager** dialog is displayed again. Click on **Coping parameters.**



The default settings are displayed here for

- Wall thickness
- PL thickness
- Cutting angle
- Width of cut surface
- Ledge for ceramic (the start and end angle as well as the collar height)

Ledge for ceramic

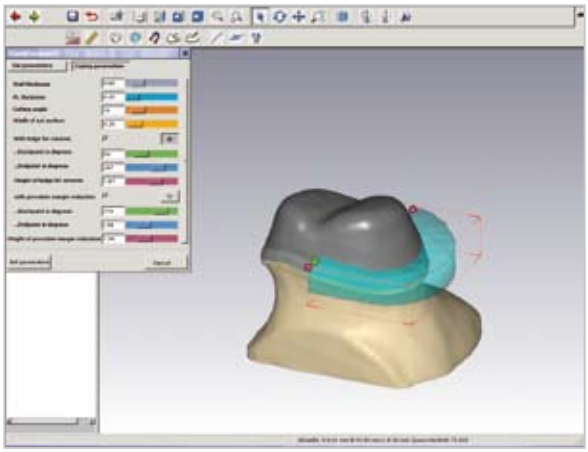
The collar runs as standard from mesial to distal over the oral region.

The start angle is 110° and the end angle 250°.

To shorten or lengthen the collar, simply change the angles.

The 0° position is located in the center of the vestibular surface and then runs **counterclockwise**.

After the activation of the **Ledge for ceramic** you will see a preview of the selected option in 3D mode.

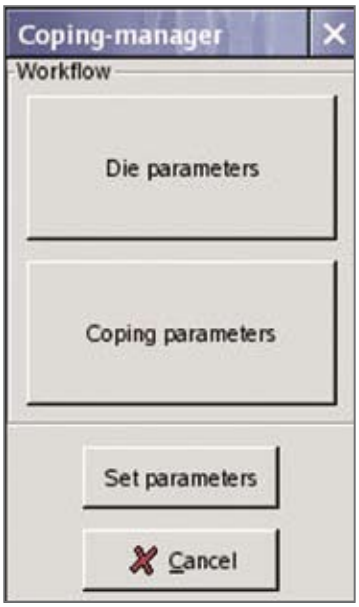


You can modify the height and the extension of the ledge for ceramic via the colored grippers. As an alternative the familiar scroll bar is available for modifying the dimensions. When both options are selected the respective function becomes visible by activating the **View** button.

Confirm the changes with **OK**.

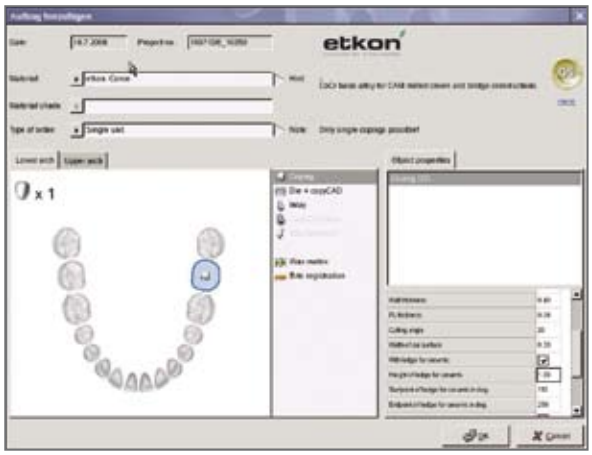
The **Coping-manager** dialog is displayed again.

To accept the chosen parameters click on **Set parameters**.



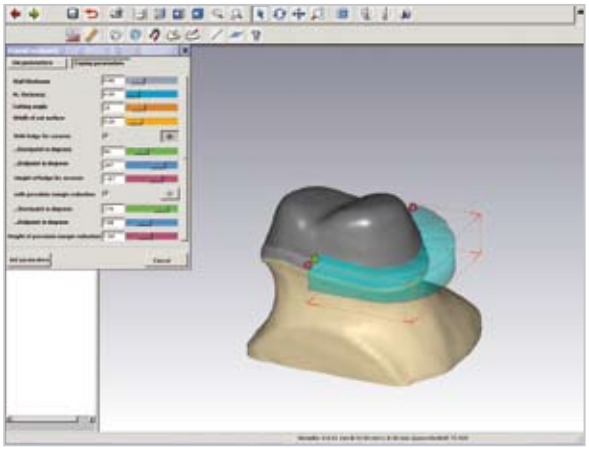
5.6 Porcelain margin reduction

A reduction for a ceramic margin on the coping can be activated via the order dialog. Subsequently, define the start and end point as well as the height of the ceramic margin reduction similarly to the collar.



After the activation of the **Porcelain margin reduction** you will see a preview of the selected option in 3D mode.

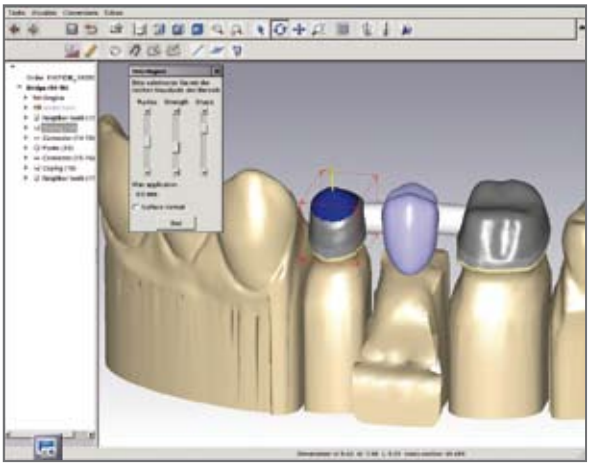
You can modify the height and the extension of the porcelain margin reduction via the colored grippers. As an alternative the familiar scroll bar is available for modifying the dimensions. When both options are selected the respective function becomes visible by activating the **View** button.



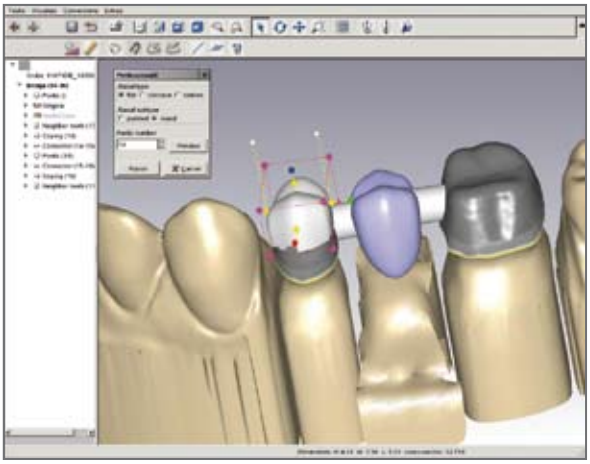
You can now start to design the coping to support the ceramic.

There are three ways of doing this:

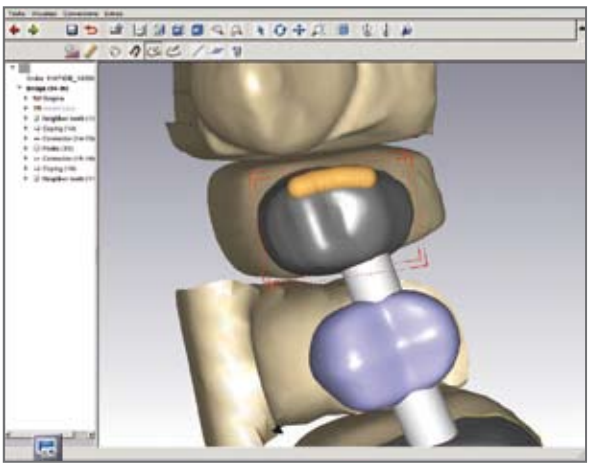
- **Wax-up Tool**



- **Occlusal coping**



- **Wax knife**



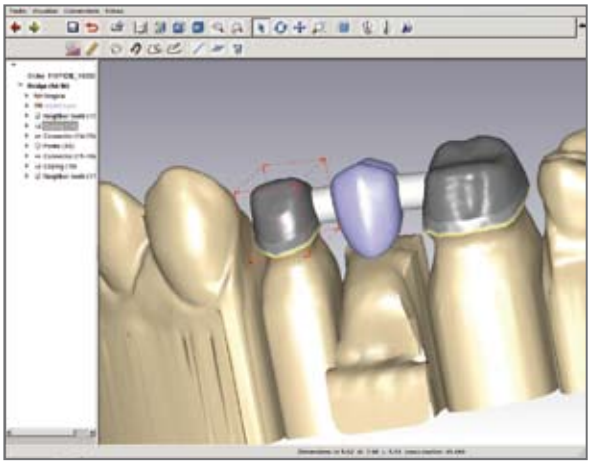
The Wax-up tool

Select the corresponding object in the design screen and click on the **Wax-up tool** icon.

Now rotate the object so that you are looking directly at the area to be built up.

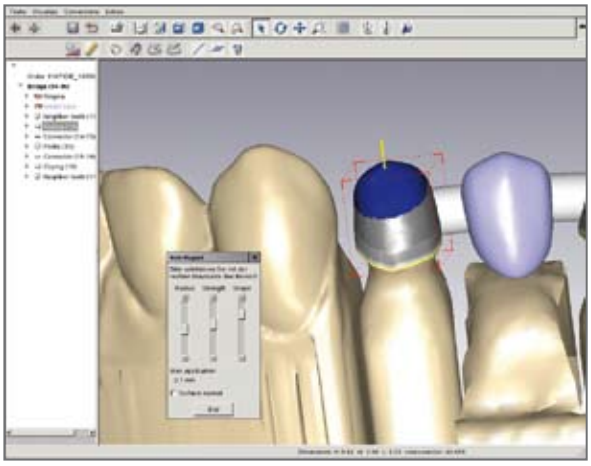
Click on this area with the right mouse button.

The build-up direction then points exactly towards you.



There are three controls to influence the build-up:

- **Radius** – size of the area of influence
- **Strength** – material application, also stated as value in millimeters below the controls
- **Shape** – varies the shape between flat and pointed



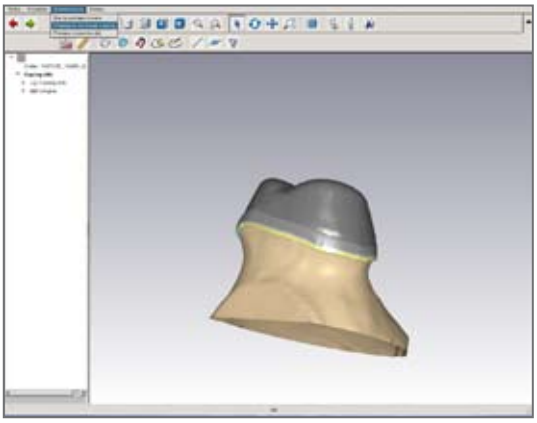
If you want to build up another area on the same crown, simply right click on it.

When finished click on **End**.

The occlusal coping
If the prepared occlusal space is very large, you can use this tool to build up the object.

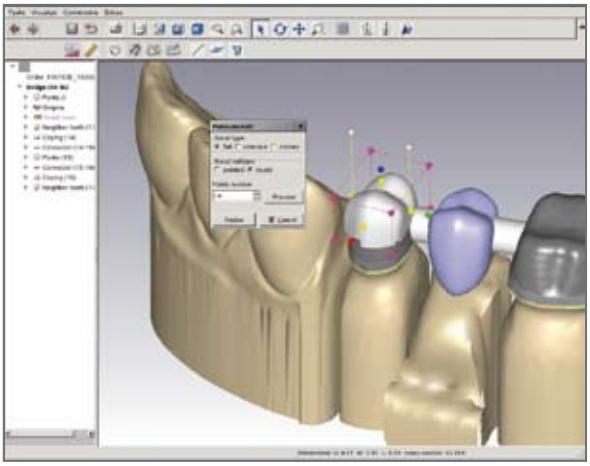
Select the object and click on the menu bar on **Conversions** and then on **Coping to occlusal coping**.

Now click on **Preview**.



You can now edit the object:

- **Yellow grippers** change the size of the object.
- **Red, blue, green, white grippers** change the object axially.
- **Pink grippers** move the object.



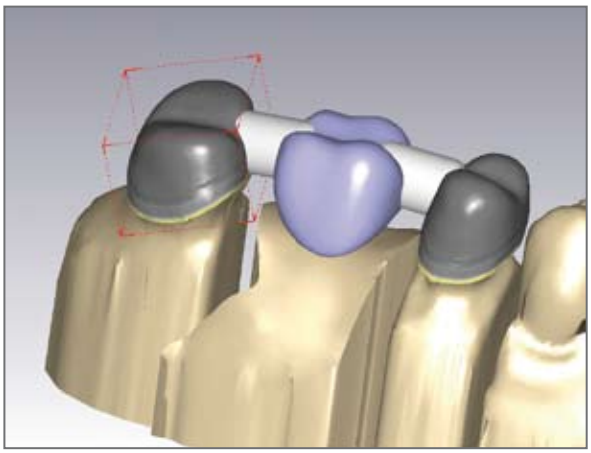
If you have achieved the desired shape and position click on **Fusion**.

The **CopyCAD Manager** then opens where you can still change parameters (see chapter 6.3).

Then click on **Set parameters**.

The wax knife

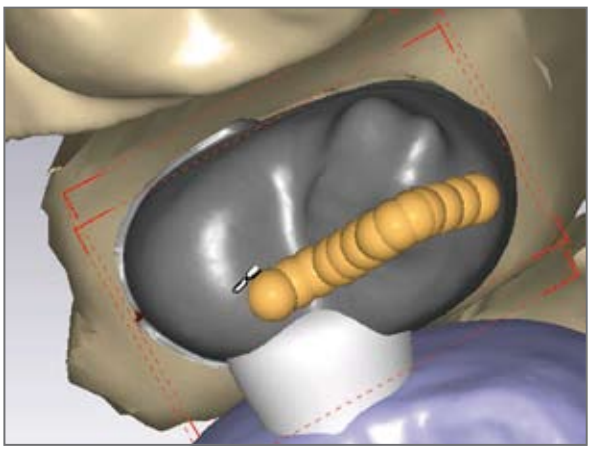
Select the object in the design screen and click on the **Wax knife** icon.



The cursor changes to a small wax knife.

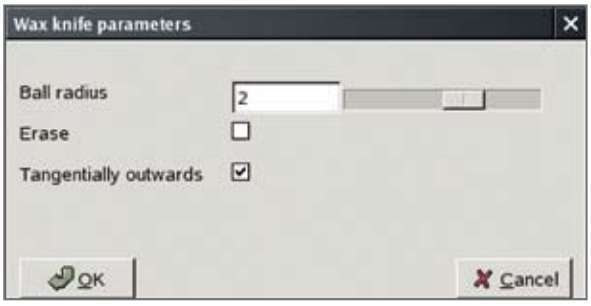
Now keep the left mouse button pressed and move the wax knife over the region of the crown that you want to build up.

When the left mouse button is released the material applied is added to the object.



You can also use the wax knife to remove material from the design.

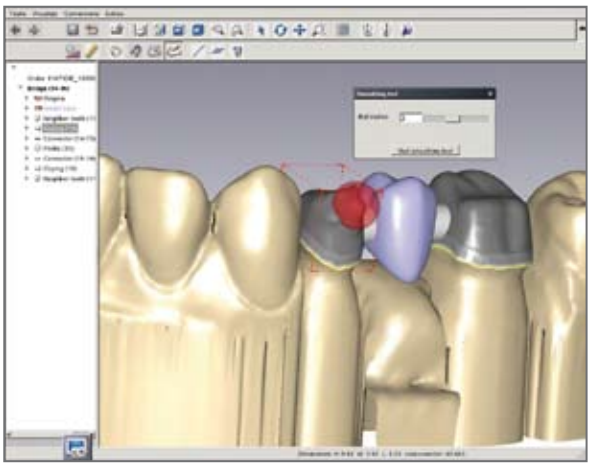
You can activate the **Erase** function in the parameters (right click the mouse on the screen which opens the parameter window) or you can use the space key on your keyboard. Now proceed as usual.



To smooth the coping surface, click on the **Smoothing tool** icon.

The cursor changes into a transparent red ball.

Now keep the left mouse button pressed and move the red ball over the region of the coping that you want to smoothen.



5.6.1 Gripper colors

Gripper color	Description
Pink	Parallel shift of the entire object
Blue	Rotating the object about its sagittal axis
Red	Rotating the object about its transverse axis
Yellow	Changing the size in the direction of the gripper used
White	Rotating the object about the mesial axis or distal axis
Green	Rotating the object about the vertical axis

5.6.2 Die parameters

Die parameter	Description
Cement gap	Thickness of the cement gap
Die spacer	Thickness of the virtual die spacer
Beginning of spacer above PL	Start of the virtual die spacer above the preparation line (in mm)
Correction of milling radius in %	States by how many percent the occlusal edges should be blocked out. 0 % switches the milling radius correction off.

5.6.3 Coping parameters

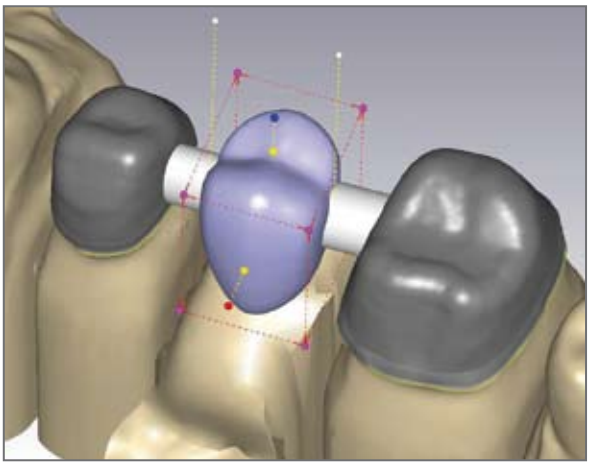
Coping parameter	Description
Wall thickness	Wall thickness
PL thickness	Thickness of the framework wall along the preparation line
Cutting angle	Angle to the base plate for setting the cutter
Width of surface	Width of the cut surface
With ledge for ceramic	Activates collar **Note** For collar in the palatal or lingual region the start angle should be set to 110° and the end angle to 260°. A 360° collar is also possible.
Start point in degrees	Start angle of the collar in degrees 0° means the same as the center of the vestibular side The course is counterclockwise
Endpoint in degrees	End angle of collar in degrees
Height of ledge for ceramic	Collar height

5.6.4 Designing pontics

Double-click on the pontic in the 3D display.

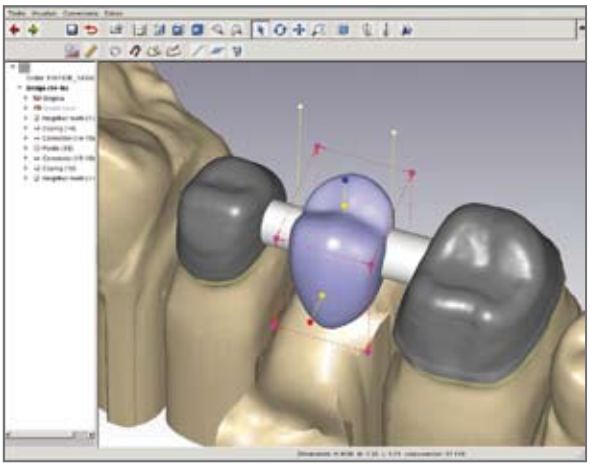
Alternatively, click on the corresponding pontic once with the left mouse button in the feature tree.

The pontic now has a red frame with grippers to adjust the size and reposition as needed.



Color code of grippers:

- **Yellow grippers** change the size of the object.
- **Red**, **blue**, **green**, **white grippers** change the object axially.
- **Pink grippers** move the object.

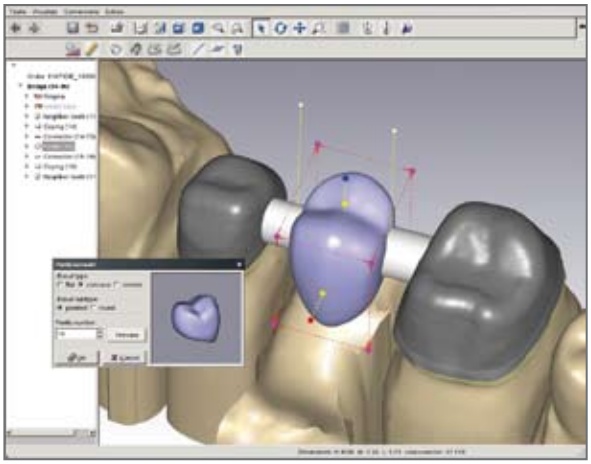


5.6.5 Exchanging pontic

Step 1
Right click on the corresponding pontic in the feature tree.

Now click on **Replace object**.

Step 2
The **Pontic selection** dialog is displayed.



Step 3
Set the required options:

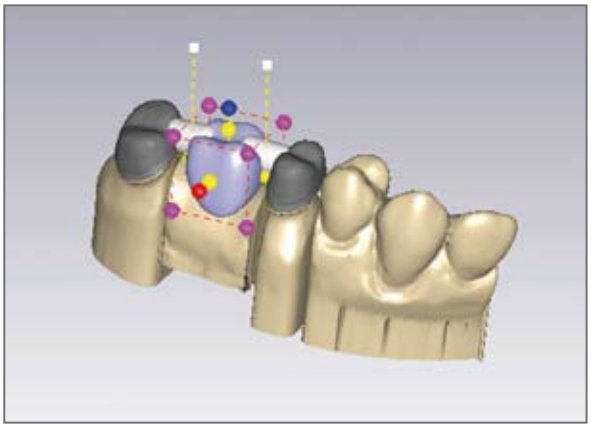
- **Basal type:** plane, concave, convex
- **Basal subtype:** pointed, round
- **Pontic number**

Step 4
Click on **OK**.

5.6.6 Reduction of pontic from the alveolar ridge

With the aid of this function you can reduce the pontic at the base virtually in order to create a uniform space between the pontic and the alveolar ridge. This is the last step of designing the pontic.

Step 1
Select the pontic you want to work on.



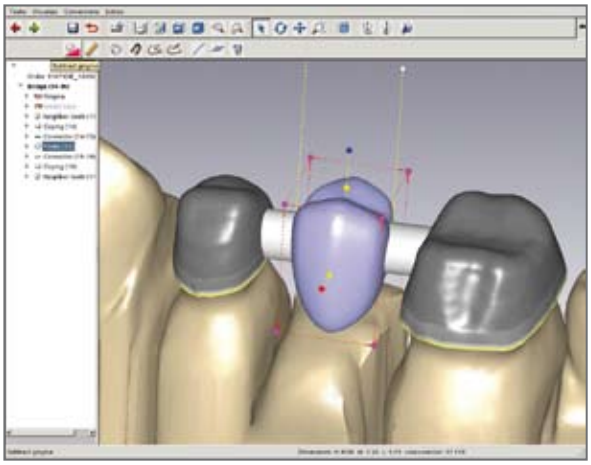
Note
To reduce the pontic basally, the pontic must have contact with the alveolar ridge.

Step 2
Click on the **Substract gingiva** icon.

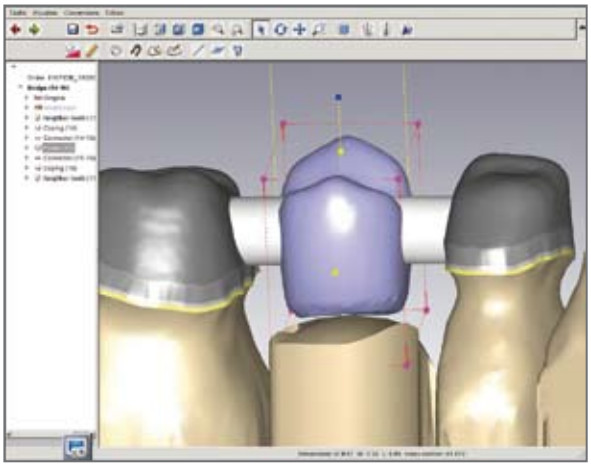
Note
It is important not to move the pontic or change its dimensions after this point.

Step 3

Enter the distance (in mm).
The pontic is reduced basally by this value.



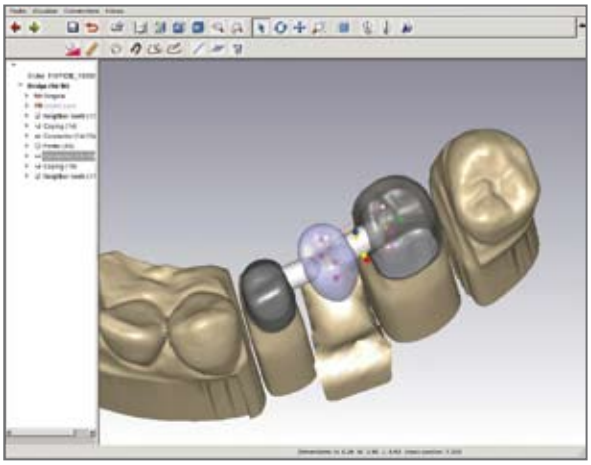
Now it is visible how the distance between alveolar ridge and pontic was uniformly calculated.



5.6.7 Designing connectors

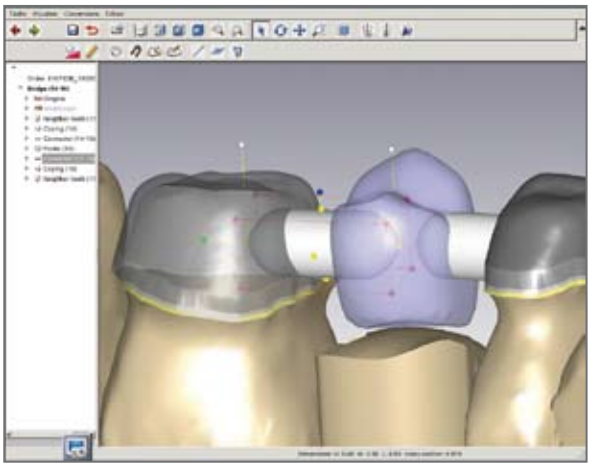
Step 1
Left click on the required connector in the feature tree.

Alternatively, double-click on the connector in the 3D view.



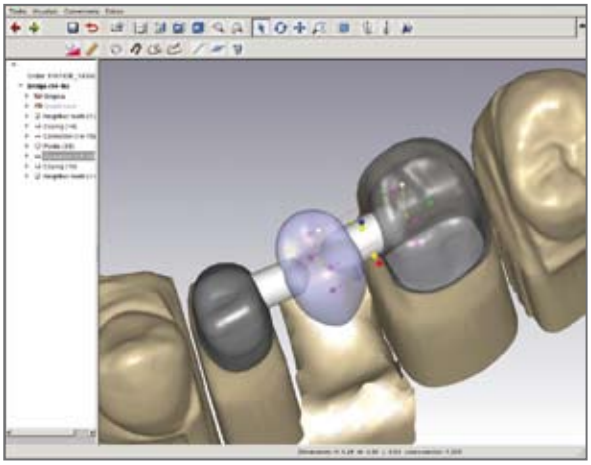
Step 2
The selected object is displayed within a red frame. Automatically, all other objects become transparent for optimum positioning of the selected connector.

The dimensions and position can be adjusted by using the colored gripper as described earlier.



Notes

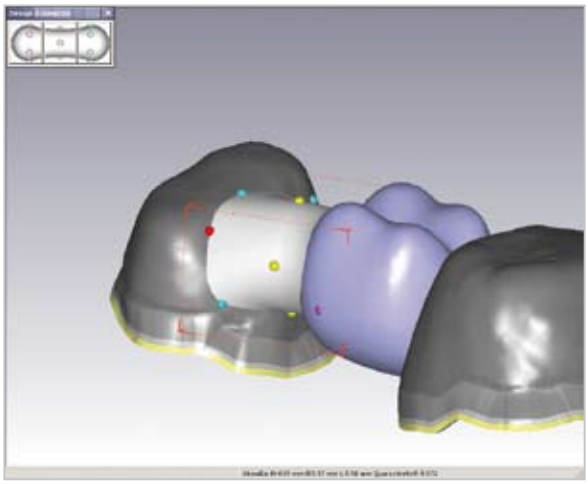
- If the selected connector turns red, you must adjust the object size so that the connector turns white again.
- The red color signals that the minimum cross-section has not been reached.
- If the selected connector turns red the minimum cross-section has not been reached and must be adjusted accordingly.



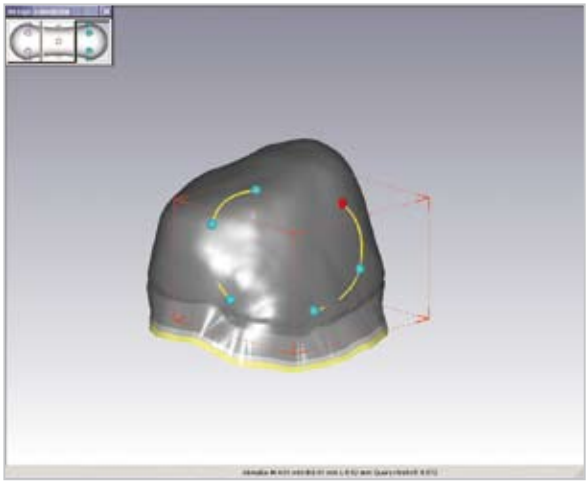
The dimensions of the selected object are displayed on the bottom right of the screen.

When the design connector has been activated the **Connector manager** opens up automatically in a new window.

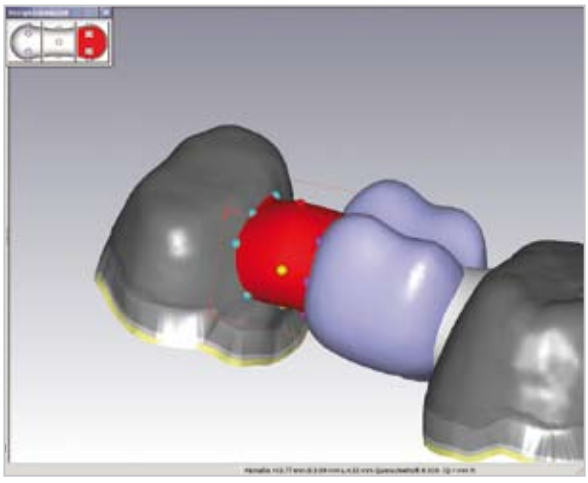
To individualize the design connector you have the possibility to modify the connecting areas by means of the shown grippers. For this please use the free 3D view or activate one of the three sections via the displayed **Connector manager**.



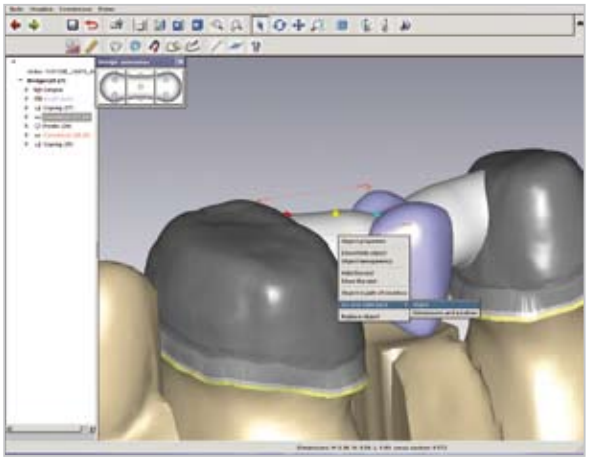
After the activation of a section the connector and the adjacent object are automatically hidden and the boundary line which can be modified is shown on the active object. Move the grippers with the left mouse button to the required position. You deactivate this mode by reactivating the manager or by selecting another object.



If the designed shape of the connector is below the required minimum cross section the connector appears in red color as usual. The section which is below the minimum cross section turns red in the small **Connector manager** window. Please correct the cross section of the highlighted section to the material-specific minimal geometry.

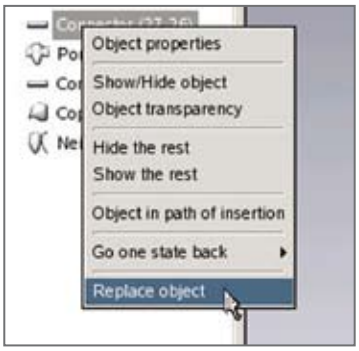


If possible, please consider to carry out the positioning of the pontics prior to the individualization of the connector. If major changes of the position are still necessary the design connector can be reinitiated via the context menu by a right click. For this please select the option **Go one state back ◊ Shape**.

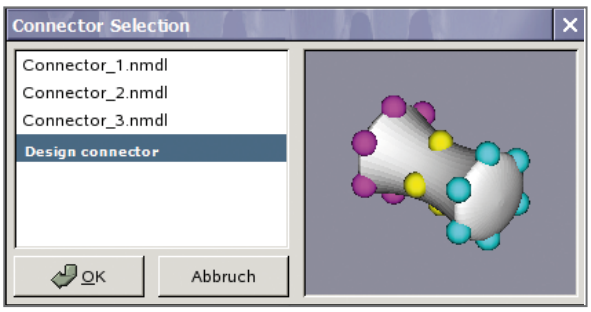


5.6.8 Exchanging connectors

Step 1
To select another connector shape, right click the connector in the feature tree and then click on **Replace object**.

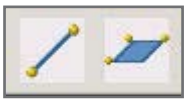


Step 2
You can choose between three different default connector shapes as well as the design connector.

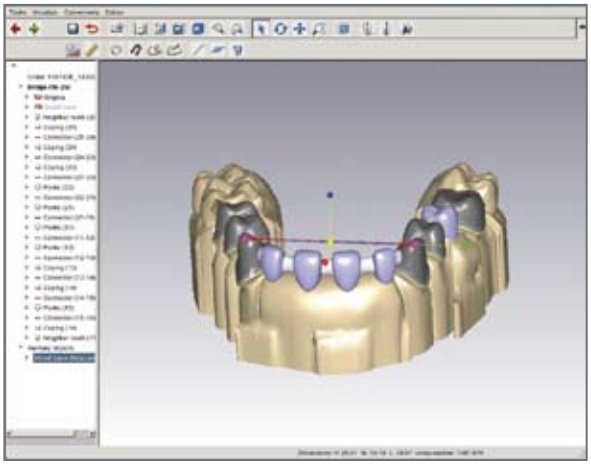


5.6.9 Freely defined help lines and planes

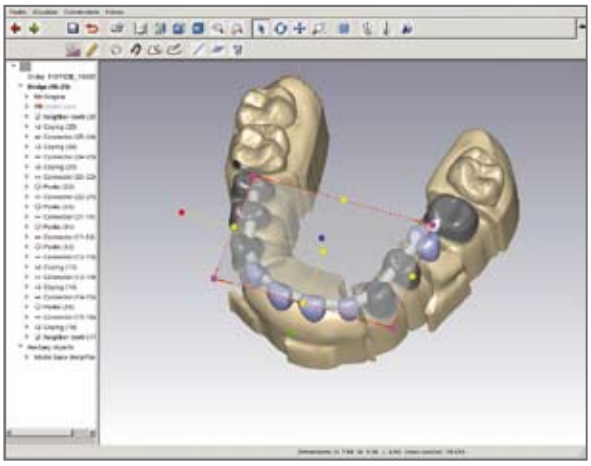
You can define arbitrary help lines and planes for support during the designing process.



To draw a help line, click on the corresponding icon and then set two arbitrary points on the model.



To define a help plane, activate the corresponding icon and then set three arbitrary points on the model.



To remove the created help lines and planes click on the **Delete help object** icon while the object is selected.

5.6.10 Undoing previous step

You can reset the last three saved states with the **Undo** function.

To save the design status click on the **Save** (floppy disk) icon. To restore the previous situation, click on the red arrow (see marking).

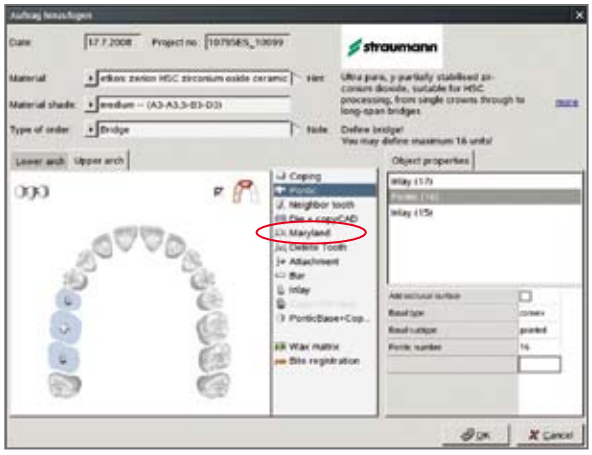
6. SPECIAL INDICATIONS

6.1 Inlay and Maryland bridge

The preparation line (PL) of inlays and Maryland bridges is not detected automatically during the scan. You can determine the preparation lines quickly and simply with the **Line selection** function.

Step 1
Define the order.

Depending on the indication you can choose between the **Inlay** or the **Maryland** tooth type.



Step 2
Follow the instructions of the Scan Manager.

Step 3
Display the die in the single view. To do so right click on the required die in the feature tree and select **Load single object.**

Step 4
For defining the preparation line three options are available:

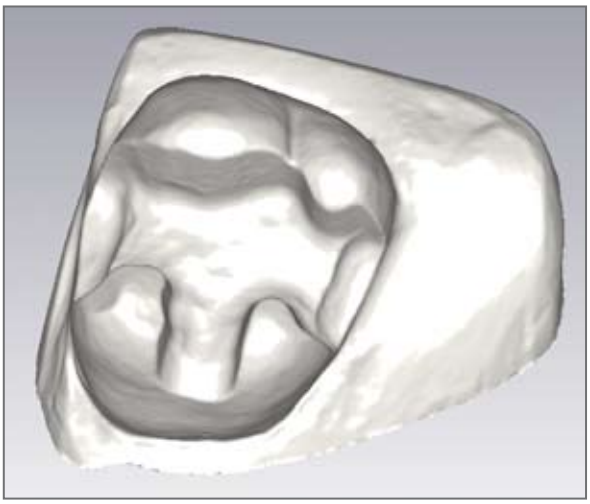
- **Selection polygon**

- **Line selection**

- **Create spline**

Option A – Selection polygon
Click on the **Selection polygon** icon.

1. Move the cursor to any point on the margin and click.
2. Define the PL with the blue line. Fix the points of each line section by left clicking the mouse button.
3. This action is ended by setting the last point of the line back on the start point.



Note
The object **cannot** be rotated in this mode.

After the prepared inlay surface is marked completely blue, click on the **Inlay/Maryland conversion** icon.

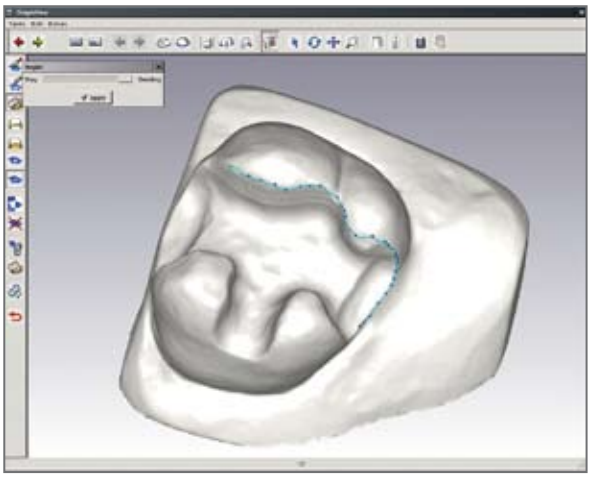
After successful conversion the area marked blue becomes white.

Now click on the **Next** icon.

Option B – Line selection
Click on the **Line selection** icon.

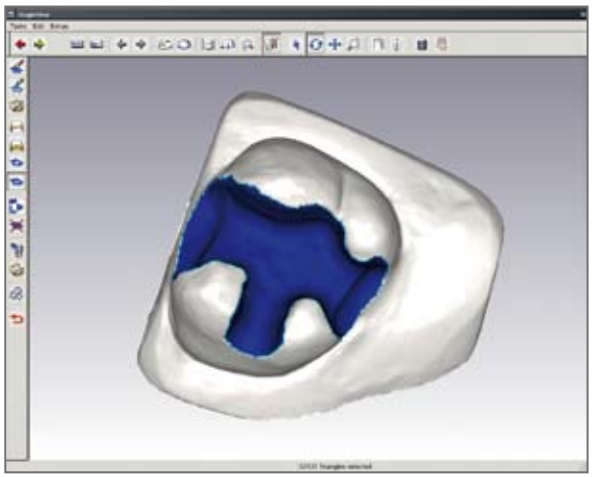
Notes

- The object can be rotated in this mode.
- The more points used along the preparation line, the more accurately this is defined.
- You can remove the point last set in each case by clicking with the right mouse button.



1. With the aid of the controller define the criteria according to which the line is generated.
2. Set the first point of the preparation margin by clicking with the mouse.
3. Set further points of the preparation line counterclockwise.
4. Join the start and end points of the preparation line by clicking once again on the start point.

5. After the prepared inlay surface is marked completely blue, click on the **Inlay/Maryland conversion** icon.



After successful conversion the area marked blue becomes white.

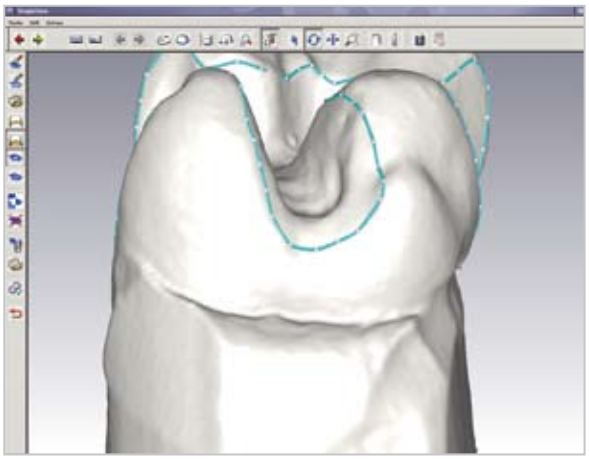
Now click on the **Next** icon.

Option C – Create spline

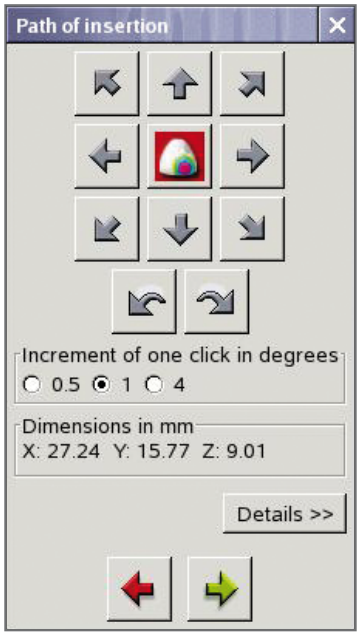
The course of the preparation line is defined via the icon **Create spline** as usual by left mouse clicks. When the preparation line is closed you can move the points on the object using the left mouse button in 3D mode to carry out corrections.

If the distance between 2 points is too large to carry out the required adjustment, you can add additional points by double-clicking with the left mouse button onto the object. Alternatively, you can add the additional points via the **+** key as usual.

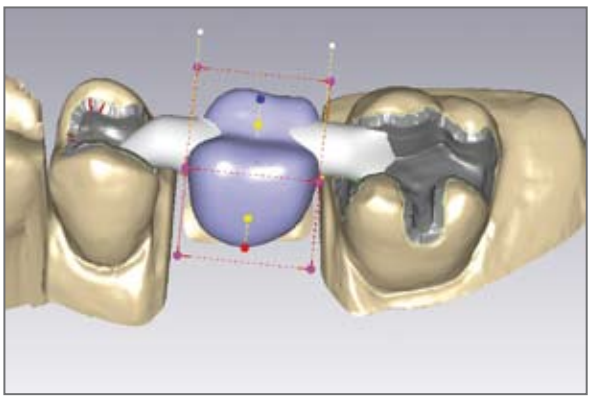
The transformation is carried out as usual by activating the green **Continue** arrow or in the case of inlays via the function **Conversion of selection into Maryland/Inlay**.



Step 5
After successful definition, now define the path of insertion.



Step 6
Now design the inlay/Maryland structure.



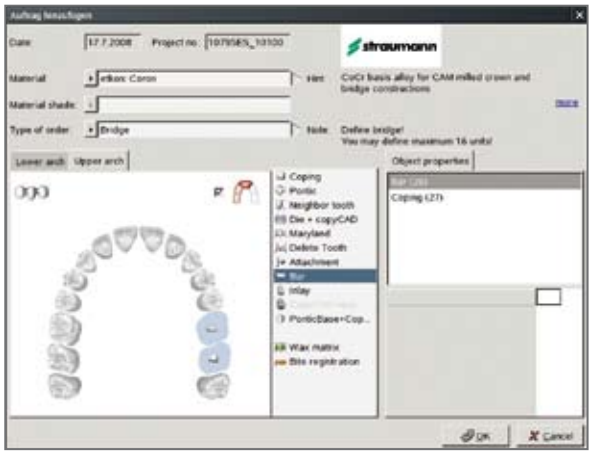
Step 7
Finalize the work with a click on the **Next/finalize** icon.

You can now send the project (see chapter 7).

6.2 Attachments

Note

Due to the complexity of the subject, it is advisable to contact technical support before starting work in difficult designs.



Step 1

Define the order type as **Bridge**.

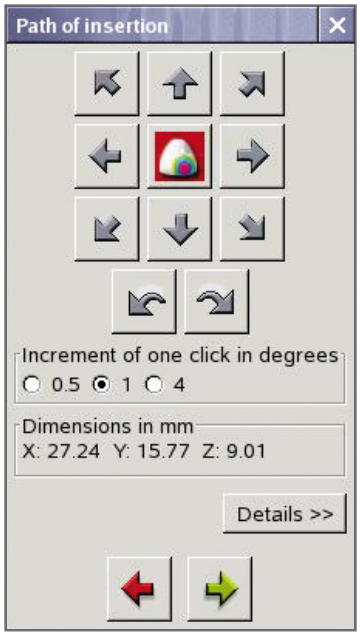
Define the tooth as **Attachment** where the attachment is to be placed.

Step 2

Follow the instructions of the Scan Manager.

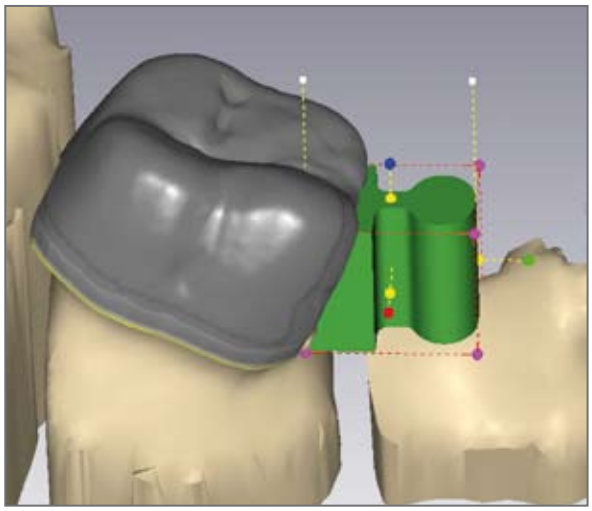
Step 3

Define the path of insertion.



Step 4
Activate the designing mode and design the crown.

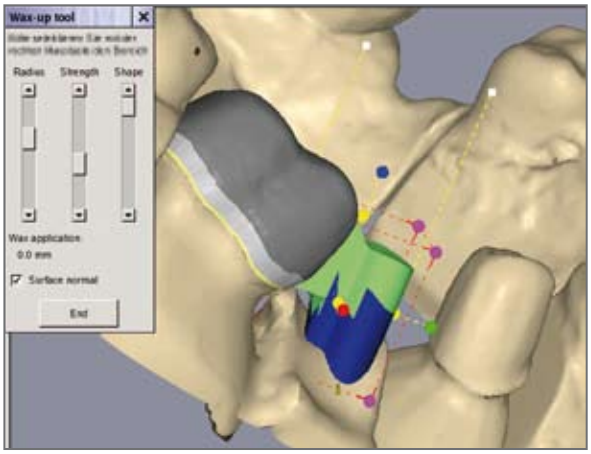
Position the attachment.



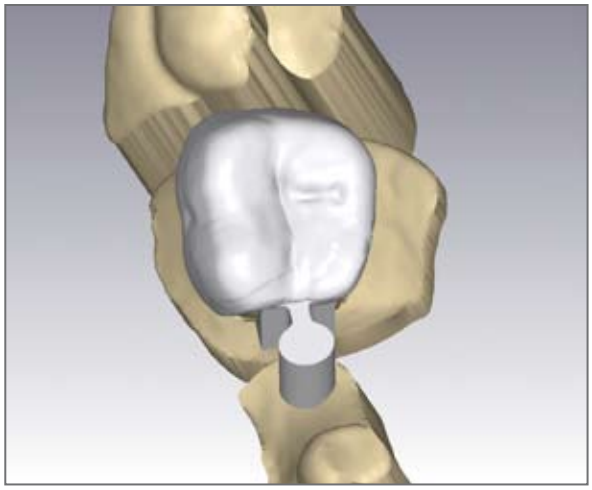
Step 5
Adjust the attachment to the path of insertion.

Follow the neighboring tooth to align the attachment for the secondary path of insertion.

Furthermore, you can adapt the attachment basally with the **Wax-up tool** and reduce it basally with the **Substract gingiva** function.



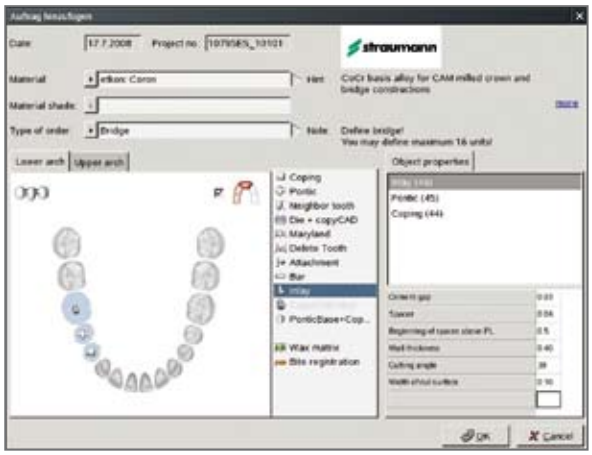
Step 6
Finalize the work and send the project (see chapter 7).



Step 7
Once you have adjusted the primary structure, you can start the secondary design.

Define the matrix as an **Inlay**.

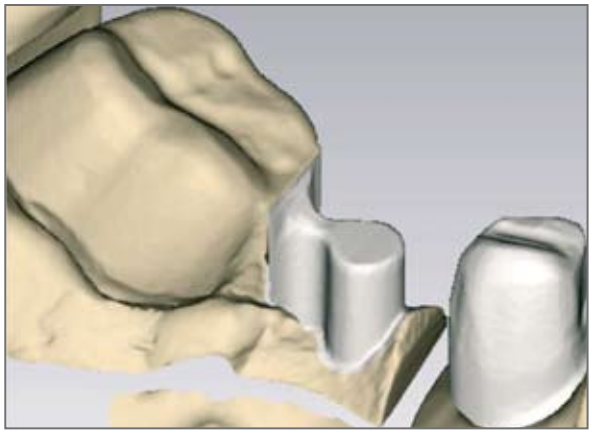
Define all of the other elements as usual.



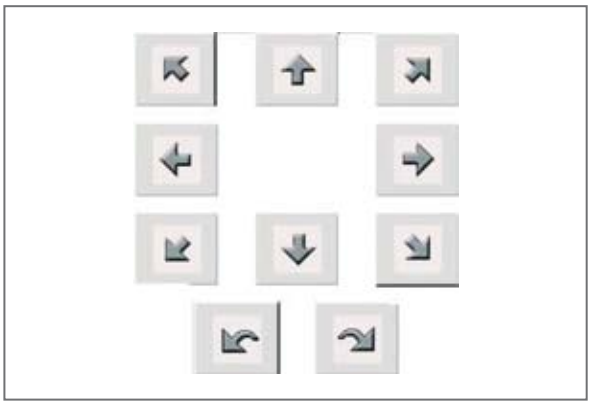
Notes

- Close the gap between the attachment and the alveolar ridge with wax. Separate the alveolar ridge so that this fits in the Scan cylinder for the single scan of the attachment.
- If the attachment is on a bridge, you should duplicate the model and then separate the attachment.

Step 8
Now define the limit of the attachment, as you already know from the inlay function.



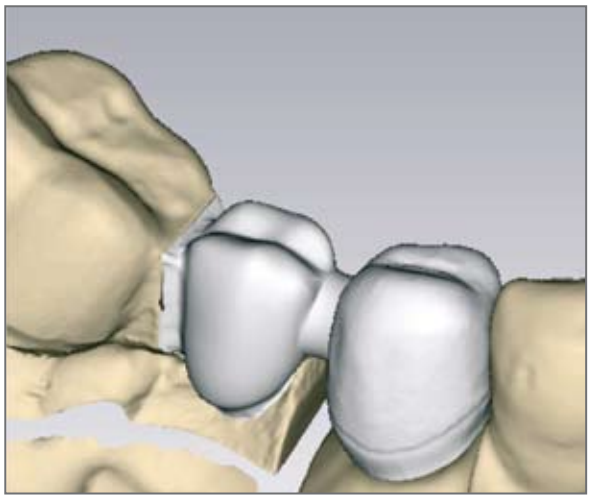
Step 9
Define the overall path of insertion of the bridge.



Step 10
Design the secondary construction.

Generate an adhesive gap by widening the cement gap and die spacer using the inlay parameters of the inlay.

Step 11
The primary and the secondary design are now finished.



Note
Hide the alveolar ridge after finalizing and check the secondary attachment from the basal aspect.

Step 12
Finalize the work with a click on the **Next/finalize** icon. You can now send the project (see chapter 7).

6.3 CopyCAD

You can scan wax-ups with the **CopyCAD** function.

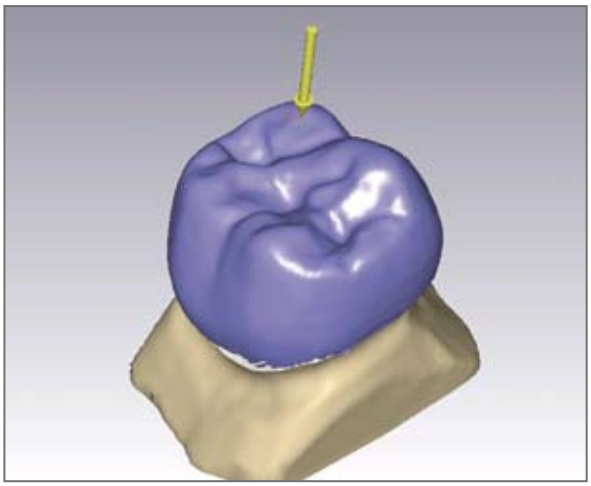
Notes
- The wax-ups must:
  - be removable
  - fit easily and securely on the die
  - not reflect
- The wax used must be suitable for scanning, e.g. etkon™ CopyCAD wax.
- Waxing down to the preparation line is not required but is recommended, since the die is scanned separately to create the margin.

Step 1
Define the order.

Independently of the order type (**Single unit** or **Bridge**) select the relevant tooth/teeth in the dental arch and define as **Die + copyCAD**.

Step 2
Scan the project.
Wax-ups are scanned in two steps:
1. A normal scan of the die
2. A scan of the die with the wax-up placed on it

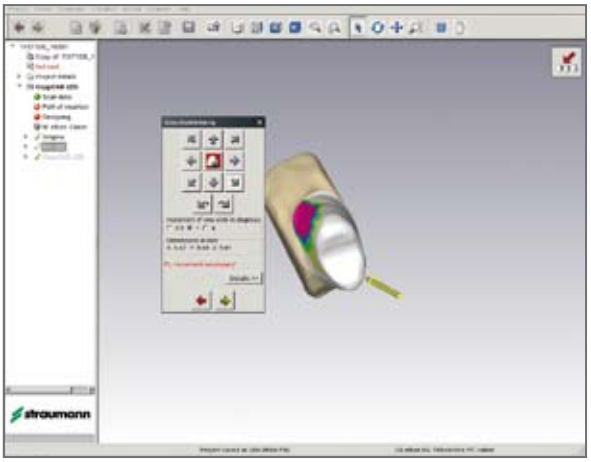
For bridges all dies are scanned first and then with the applied wax-ups.



Note
The position of the die in the Scan cylinder must not be changed while placing the wax-up for the second scan.

Step 3
Define the path of insertion.

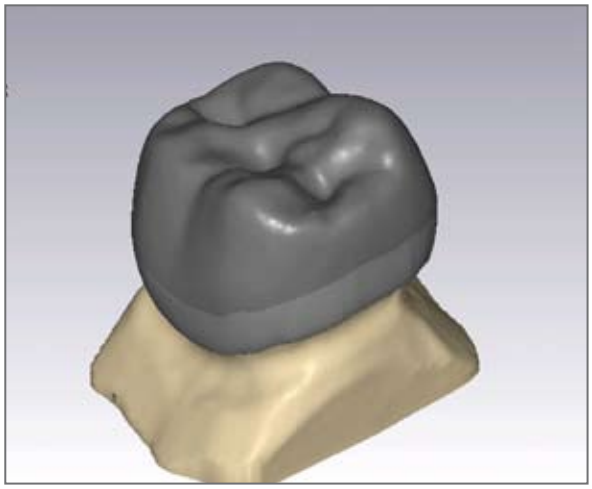
The CopyCAD is **automatically hidden** when determining the path of insertion and it will be displayed again in the design stage.



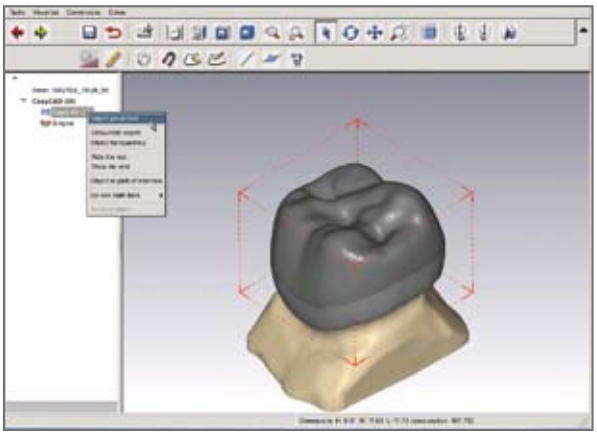
Step 4
Design the project.

Click on the **Next** icon.

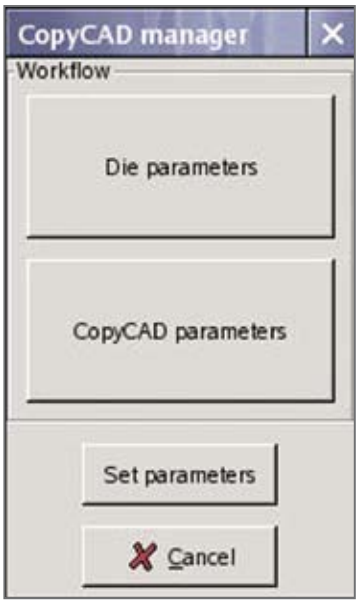
In the modeling view, the coping and wax-up are shown here merged with one another.



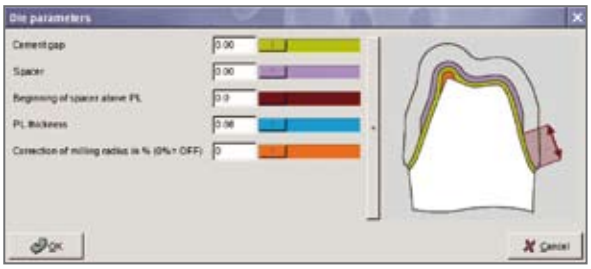
Step 5
Activate the **CopyCAD manager** by right clicking on the CopyCAD object and selecting **Object properties**.



The **CopyCAD manager** dialog is displayed.



Step 6
Click on **Die parameters**.



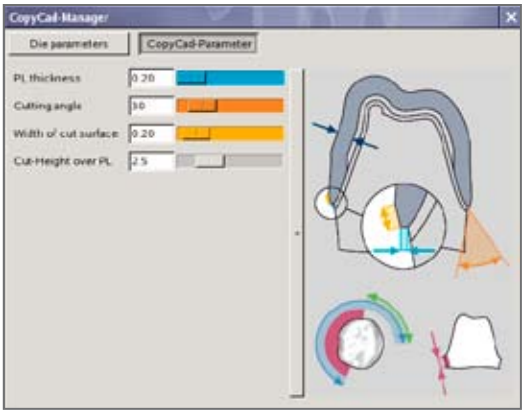
Here the standard settings are shown for:
- Cement gap
- Die spacer
- Beginning of spacer above PL (preparation line)
- Correction of milling radius

On the right is a diagram that shows the area of influence of all parameters.

To change the parameters, simply move the corresponding slider.

Confirm the changes with **OK**.

Step 7
Click on **CopyCAD parameters**.



The standard settings are shown for:
- PL thickness
- Cutting angle
- Width of cut surface
- Cut-Height over PL

Cut-Height over PL determines at which height above the preparation line the scanned wax-up ends.

On the right side there is a diagram that shows the area of influence of all parameters.

Step 8
Click on the **Next** icon.

6.4 CopyCAD bridge

Preparation

Please note that in model production for bridges with several pontics in succession, the individual alveolar ridge parts are separated from one another and can be removed individually from the model.

For scanning each pontic must fit in the Scan cylinder with the corresponding alveolar ridge part.

Wax up the bridge completely in scannable wax.

Underline the pontics with silicone, so that each pontic is held securely on the alveolar ridge after separation of the bridge.

Fix the silicone ring onto the model before the first scan.

Note

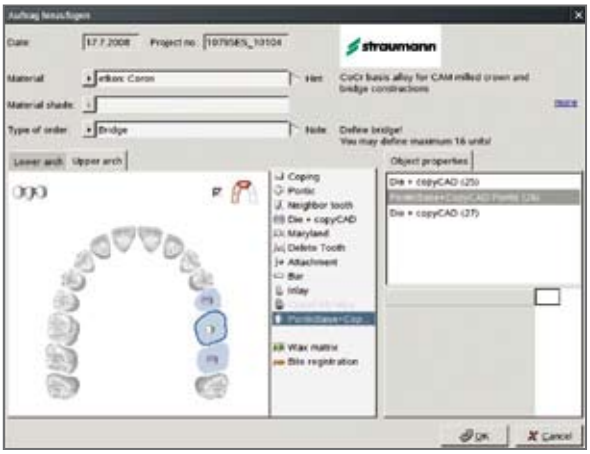
Since the bridge must be divided for the scan, it is important to fix the position of the pontic for the scan. The pontic must be in the exact position that it had in the bridge. It cannot be corrected later.

Advantages

- This reproduces the basal shape of the pontic reliably.
- The position of the pontic in the bridge is secured.
- Referencing is simplified.

Step 1
To define a CopyCAD bridge, select the abutment teeth in the tooth diagram and define these as **Die + copyCAD**.

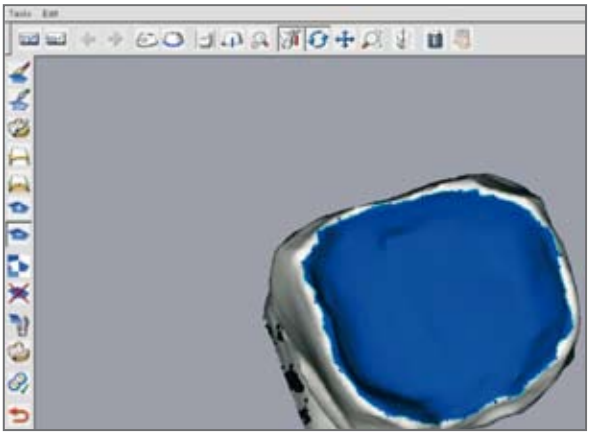
Define the pontic as **PonticBase+CopyCAD Pontic**.



Step 2
After scanning successfully, the basal surface must be defined first.

Using the **Next** icon you are guided automatically to this step.

Step 3
The best way to define the basal area is with the **Selection polygon** or the **Line selection** as described in chapter 6.1 (Inlay and Maryland bridge).

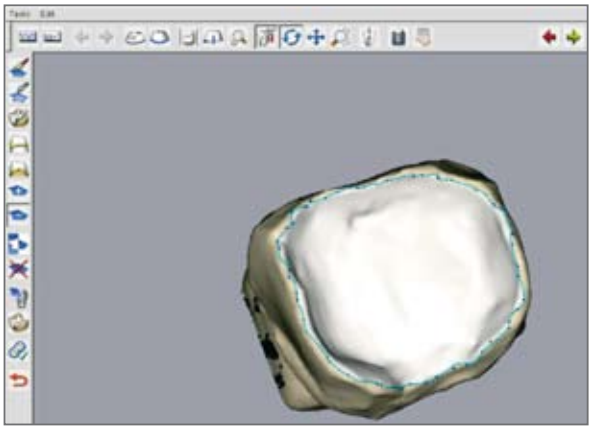


Step 4

Now convert the area marked blue by clicking on the icon **Inlay/Maryland conversion**.

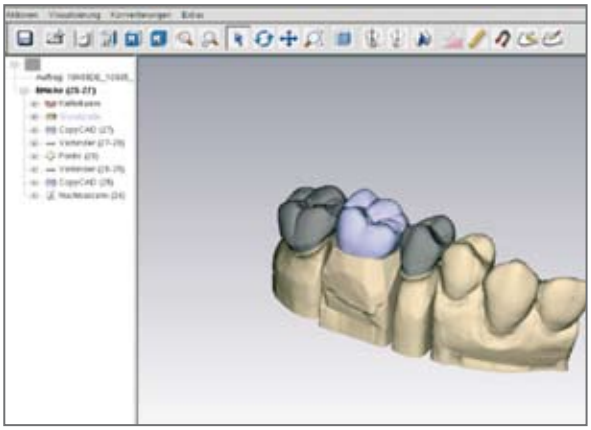
Note

After the conversion the previously blue area turns white and the remainder of the die is beige.



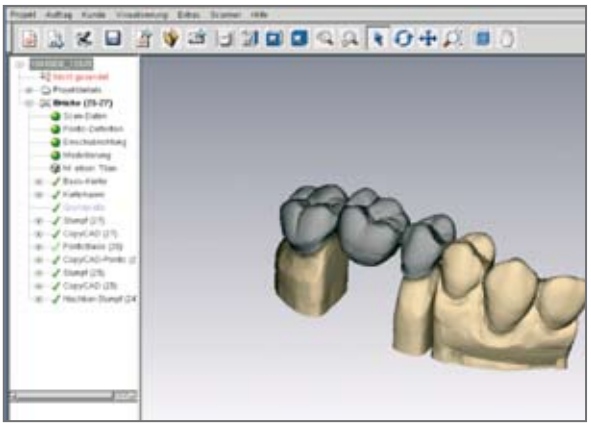
Step 5

You can now align the connectors of the bridge and, if necessary, change parameter settings.



Step 6
Finalize by clicking on the **Next/finalize** icon.

You can now send the project (see chapter 7).

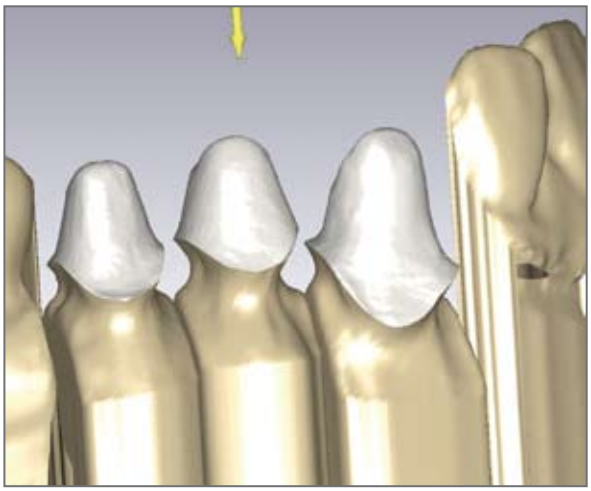


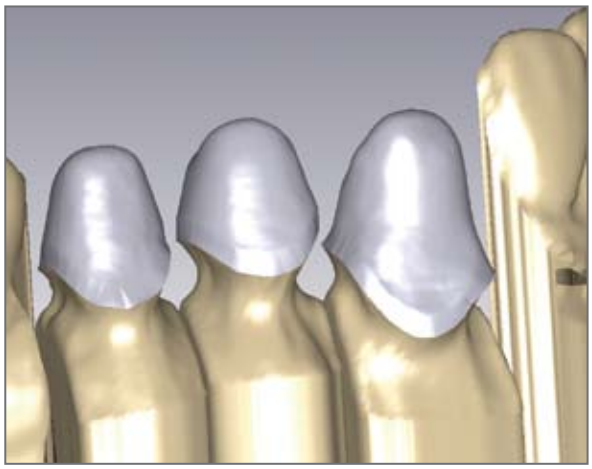
6.5 Single units in bridge context

To design several single copings in the arch, it is helpful to see all copings in context.

In the order dialog define the order type as **Single units in bridge context**.

You can now edit all copings simultaneously on the model.





6.6 Separating bridges

You can separate bridges that must be divided subsequently into several orders with a single mouse click.

The separation must be performed before selecting the path of insertion.

⚠ Caution
- This process cannot be reversed!
- Create a copy of the project for safety before separating.

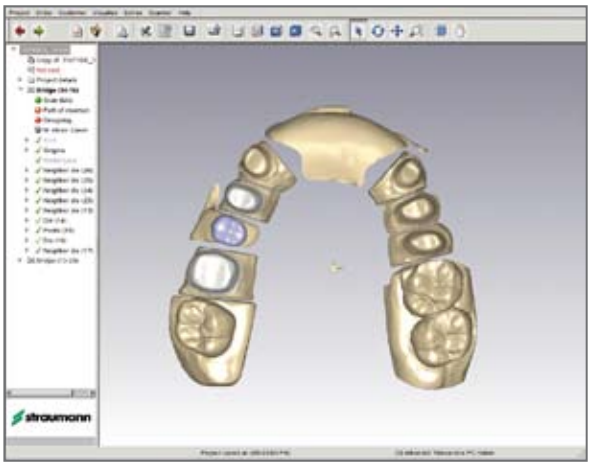
Note
Please note that the separating direction runs clockwise.

In our example, the bridge should be separated between 13 and 14.

Right click on die 14 and select **Separate order here**.

Then continue as usual with the path of insertion and designing.

Note
Once you have finalized the first bridge, it will also be displayed when the next bridge is designed.



6.7 Duplicating an order

If you want to have a work produced several times, you can duplicate orders.

Right click the mouse on the corresponding bridge or coping in the feature tree and select **Duplicate order**.

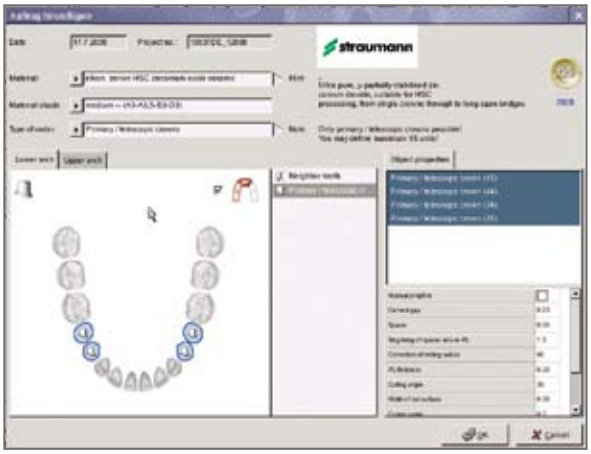
Note
Duplicating can be done in every status before dispatching.

6.8 Primary crowns

Step 1
Define the order.

Select the **Primary/Telescopic crowns** order type.

Select all teeth in the tooth diagram that should be primary crowns and click on **Primary/Telescopic crown** in the tooth type section.



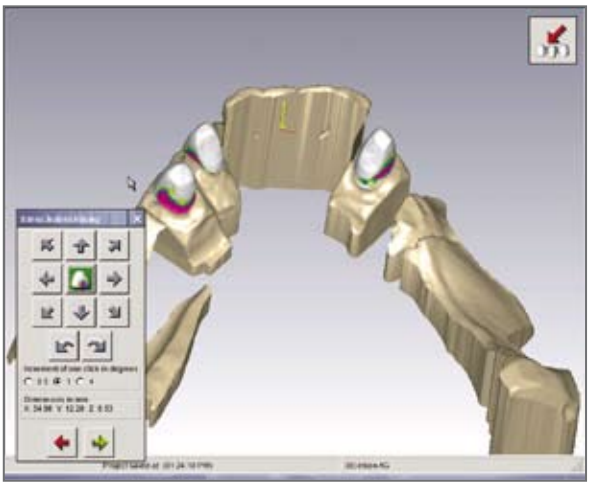
Note
The model could be set on a parallelometer to achieve the optimum secondary path of insertion.

Step 2
Follow the instructions of the Scan Manager.

Step 3
Click on the **Next** icon.

Define the **Secondary path of insertion**.

The **Secondary path of insertion** dialog is displayed.



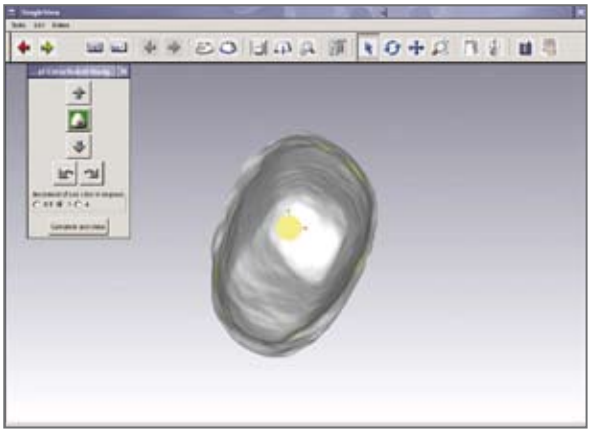
Note
The secondary path of insertion in etkon™_visual corresponds to the path of insertion of a secondary construction on the finished primary crowns. Setting up this secondary path of insertion is the same definition of the direction on a parallelometer.

The secondary path of insertion corresponds to the overall insertion of the project.

Step 4
Define the path of insertion for the individual dies.

Click on the **Next** icon.

Step 5
Define the individual path of insertion for each die.



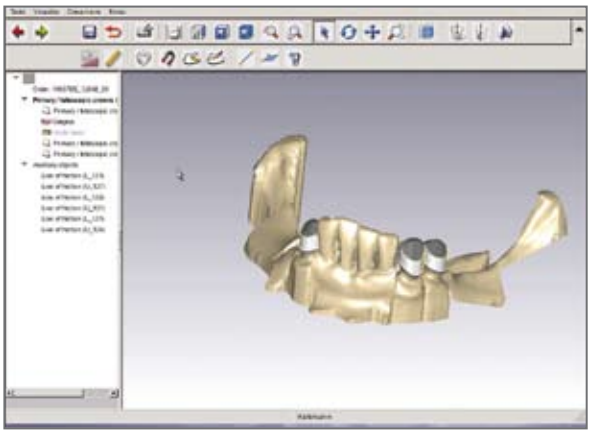
Note
This step must be performed for each die.

Then click on **Complete and close**.

Click on the **Next** icon.

Note
The path of insertion for the die corresponds to the path of insertion of the primary crown on the die.

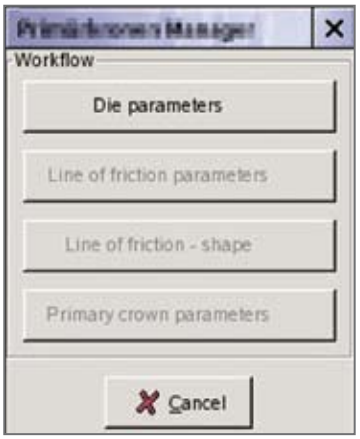
Step 6
Design the project.
Click on the **Next** icon.



Activate the **Primary crown manager** for each primary crown.

Right click on the corresponding primary crown in the feature tree and select **Object properties**.

Click on **Die parameters**.



The fit of the primary crown is defined by the following parameters:

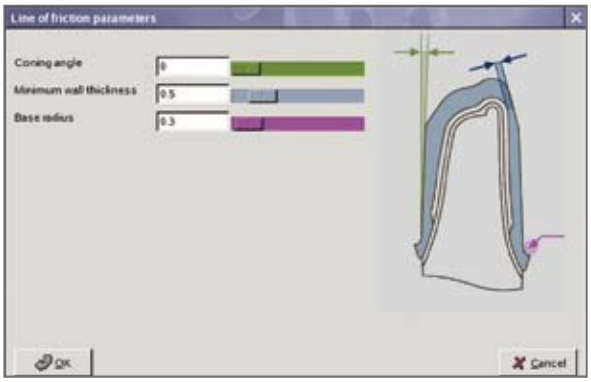
- Cement gap
- Die spacer
- Beginning of spacer above PL
- Correction of milling radius in %

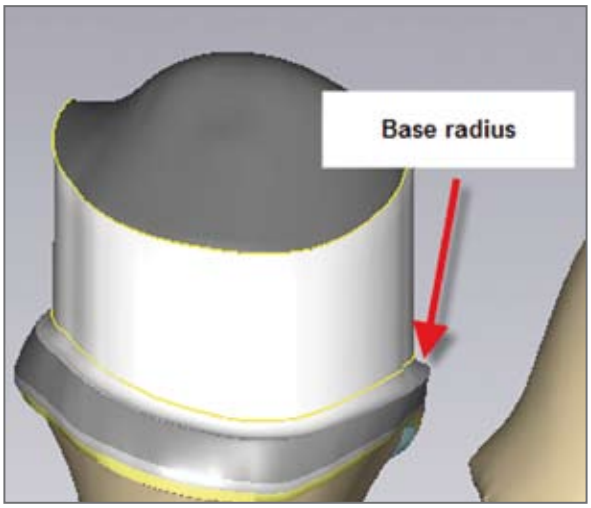
Confirm with **OK**.

Click on **Line of friction parameters**.

Define the following parameters for the friction area:
- Coning angle – angle of the primary crown
- Minimum wall thickness
- Base radius – width of the transition from the lower friction line to the friction area

Confirm with **OK**.





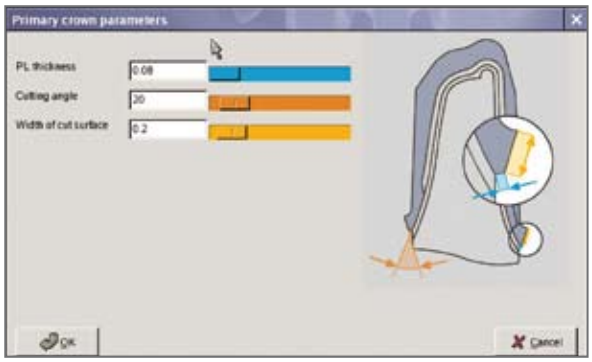
Click on **Line of friction – shape**.

The course of the upper and of the lower friction line is defined here:
- Adjustment area – The slider defines the length of the friction line over which the change of form is performed
- Smooth – compensates major irregularities of the friction line
- Reset – Sets the friction line back to the starting position

Confirm with **OK**.

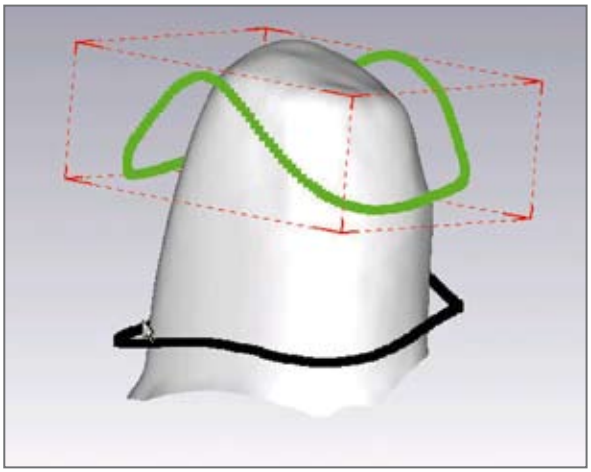
Note
Work with the largest possible area of influence to generate a homogeneous line form.

Click on **Primary crown parameters**.



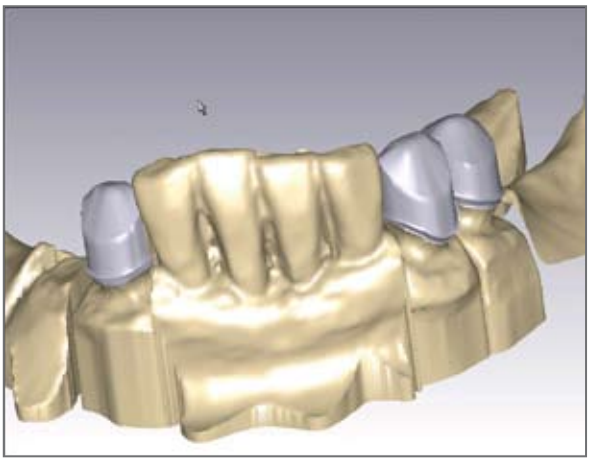
General parameters for crowns:
- PL thickness
- Cutting angle
- Width of cut surface

Confirm with **OK**.



Step 7
Finalize the work by clicking on the **Next/finalize** icon.

You can now send the project (see chapter 7).



6.9 Straumann® CADCAM abutments

Intended use

- Cement-retained crowns and bridges
- Screw-retained, directly veneered crowns (zirconium dioxide abutments only)

Materials

- Titanium
- Zirconium dioxide

Straumann® CADCAM abutments are available for Straumann® Bone Level and Straumann® Soft Tissue Level implants.

6.9.1 Technical requirements

The following components are required for designing and ordering Straumann® CADCAM abutments:

Scanner	
	etkon™ es1 The wax-up of the abutment is scanned with the etkon™ es1 scanner.
etkon™ Wax-up Kit	
	etkon™ Wax-up Kit The etkon™ Wax-up Kit includes all Wax-up sleeve holders required for restoration of the complete Straumann® Dental Implant System. Wax-up sleeve holders are required for correct scanning of the customized abutment.
Wax-up sleeves	
 NN RN WN NC RC	**Wax-up sleeves** Wax-up sleeves are used for waxing-up the abutment. A set of Wax-up sleeves is included with every etkon™ Wax-up Kit. **Note** The Wax-up sleeves are designed for single use only. If the sleeves are used more than once, accurate reproduction of the position of the abutment with reference to the implant position cannot be guaranteed and the milling results may be inaccurate.

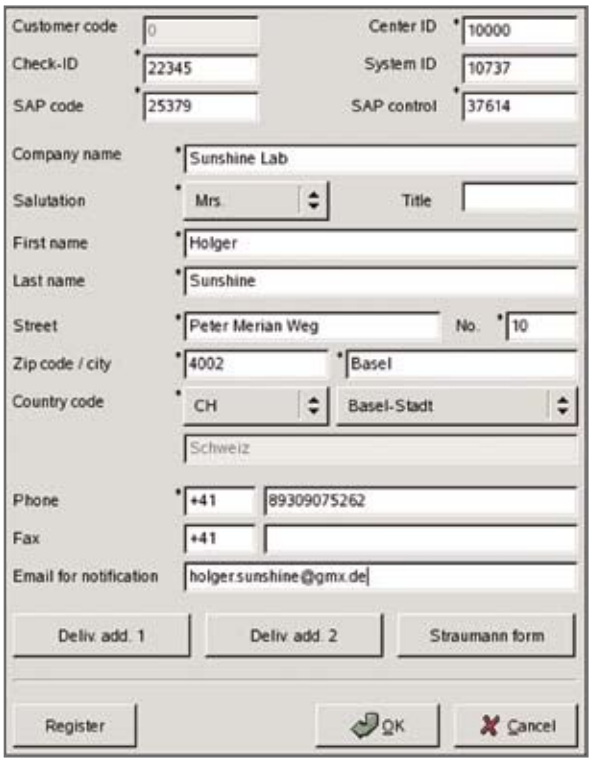
6.9.2 Registration and configuration

6.9.2.1 Initial registration in the Straumann® CARES™ Webshop via etkon™_visual

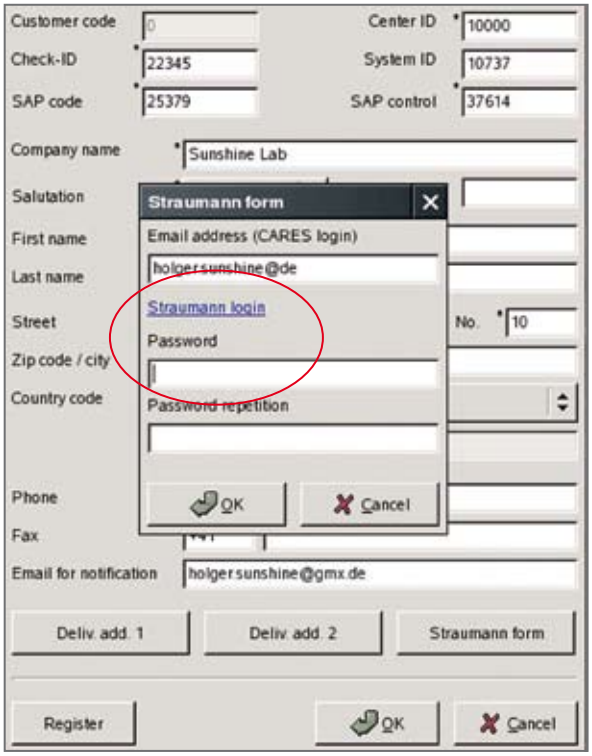
Before you can create your first order using etkon™_visual you need to register with the Straumann® Webshop.

Note

For registration you need a current valid e-mail account that you can access. If you do not have an e-mail account, it can be set up for you with the Straumann® Support Hotline.



Open the Straumann® form by clicking on **Straumann® form**. The e-mail address entered into the etkon™_visual software will automatically be transferred. Click on the **Straumann® login** link (it is not necessary to enter a password in this step).



The **Straumann® login** link takes you to the **Registration – Information about your customer account** page of the Straumann® Webshop.

The master data is automatically transferred from etkon™_visual to the Webshop. Please complete the information on language of preference, country etc. and set your personal password.

Billing address
Title: * Mr Ms
First name: * Holger
Last name: * Sunshine
Company name: Sunshine Lab
Straumann customer number:
Street no.: * Peter Merian Weg
ZIP code: * 4002
City: * Basel
City district:
Federal state/canton: * Basel
Country: * Switzerland
Language of preference: * Deutsch
Telephone: * +41 987 654 321
Fax:
Password
Tip for a secure account:
Your password should contain a combination of letters and numbers. It should not consist of a complete word or name.
Example: Create your password from the first letters and numbers in a sentence:

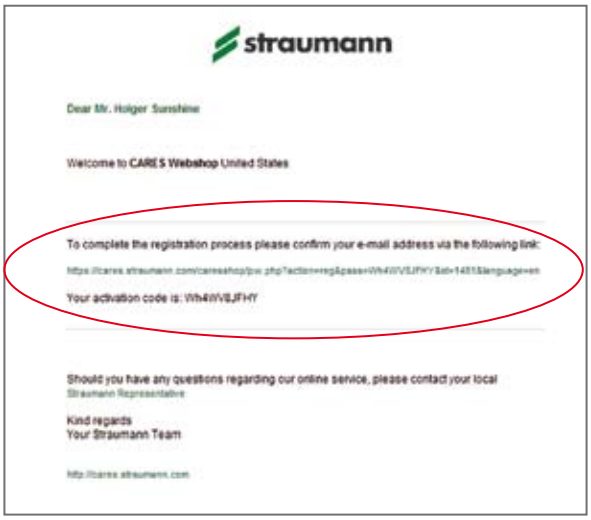
Note

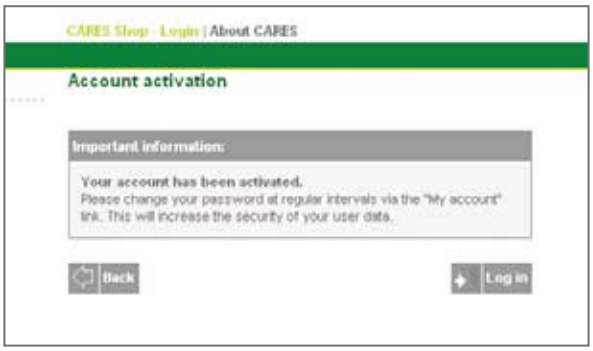
Note that your billing address can only be changed by your Straumann® representative. It cannot be changed via the Straumann® Webshop later on.

After checking your customer data, accept the general terms and conditions and confirm it by clicking on **Register**.

Password
Tip for a secure account:
Your password should contain a combination of letters and numbers. It should not consist of a complete word or name.
Example: Create your password from the first letters and numbers in a sentence:
"My 2 children are called John and Lisa" gives:
"M2cac.Jal."
e-mail address: * holger.sunshine@gmx.com
Password: *
Confirm password: *
Optional
Stay informed about new products and informations.
Please send me emails with latest updates and information about CARESShop
Newsletter subscribe
I have read and accepted the Standard Terms and Conditions and the Privacy Statement.
Register

You will receive the activation code for your account at the e-mail address you entered during registration. The account is activated by clicking on the green link in the message.


straumann
Dear Mr. Holger Sunshine
Welcome to CARES Webshop United States
To complete the registration process please confirm your e-mail address via the following link:
Your activation code is: Wh4iiVBJFHY
Should you have any questions regarding our online service, please contact your local
Straumann Representative
Kind regards
Your Straumann Team

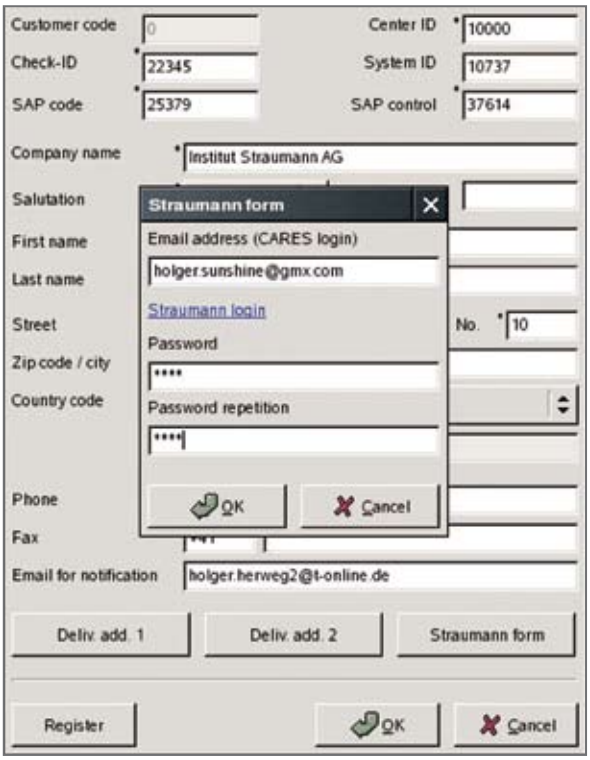

CARES Shop - Login | About CARES
Account activation
Important information:
Your account has been activated.
Please change your password at regular intervals via the "My account" link. This will increase the security of your user data.
Back
Log in

Activation in etkon™_visual

After confirming the activation link, switch back to the Straumann® form (in etkon™_visual). Enter the same personal password you entered in the Straumann® Webshop.

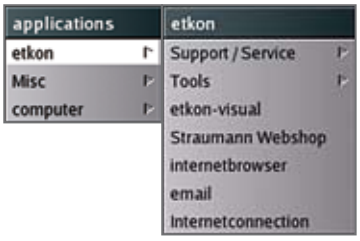
Note

If a new password is required for the Straumann® Webshop, it must also be changed in etkon™_visual. Both passwords must be identical.



Link to Straumann® CARES™ Webshop

Right click on the desktop to open the **applications** window. Click on **etkon™**, then on **Straumann® Webshop** to open the Straumann® Webshop.

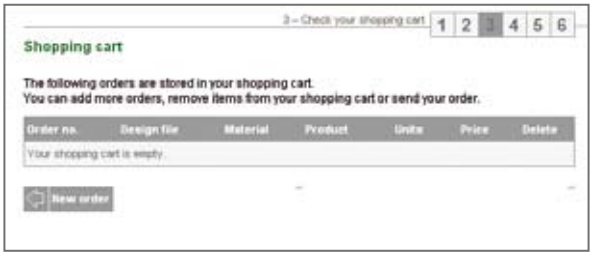


Once you have entered your e-mail address and password in the opening page of the Webshop, you can access the account overview via **My Account**.

The account overview allows you to display your account history. You can also change your password on this page.

Note

If you change your password here, you must also change it in the **Straumann® form** in etkon™_visual.



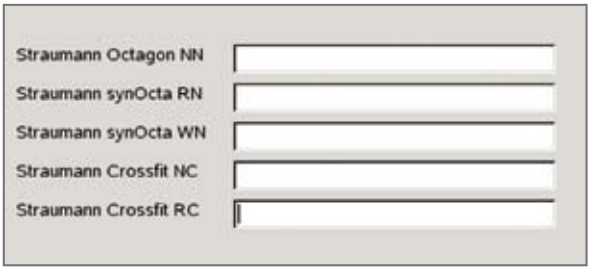
6.9.2.2 Wax-up sleeve holder configuration

All supplied Wax-up sleeve holders are individually measured after manufacturing and will be given a unique code (for example 01-1005-n34-p17), which ensures the correct alignment of the milled abutment.

01-1005-n34-p17

Wax-up abutments are always scanned in Scan cylinder 7. To be able to leave the Adapter for sleeve holder (see chapter 6.9.3.3) permanently in this Scan cylinder, enable **Exclude scan cylinder 7**. This will prevent this cylinder from being included in other scanning procedures.

Before scanning a wax-up abutment for the first time, please enter the codes of your personal Wax-up sleeve holders into the **Sleeve holder configuration (Extras > Options > Sleeve holder configuration)**.



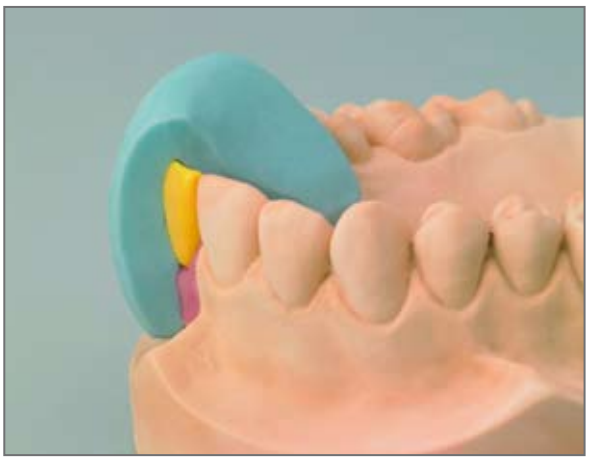
6.9.3 Lab procedure and scan process

6.9.3.1 Fabrication of the master cast

Fabricate the master cast using standard methods and Type 4 dental plaster (ISO 6873). A gingival mask should always be used to ensure that the emergence profile of the crown is optimally contoured.

A full anatomical wax-up should also be prepared for optimal aesthetic planning.

Prepare a silicone key over the full wax-up to determine the optimal shape of the customized abutment.



6.9.3.2 Modeling the abutment shape

Insert a Wax-up sleeve into the master cast.

Use the Wax-up sleeve to model the shape of the abutment.

Notes

- Use a scannable wax to ensure an accurate scan (e.g. CopyCAD Wax from Straumann®). If no scannable wax is used apply Aqua Spacer[1] scanning lacquer.
- The projecting part of the Wax-up sleeve must always be cut off before scanning, otherwise this section will also be scanned and therefore milled.
- Do not wax below the basal margin of the Wax-up sleeve (see also illustration on the next page).

[1] Aqua Spacer is a brand of al dente, dentalprodukte, Dieselstrasse 20, 88074 Meckenbeuren, Germany

Preparing wax-ups

The required components are described in chapter 6.9.1 "Technical requirements".

Shortening the Wax-up sleeve and shaping the preparation margins

The projecting part of the Wax-up sleeve must always be cut off before scanning, otherwise this section will also be scanned and therefore milled.

Sharp-edged modeling must be avoided.

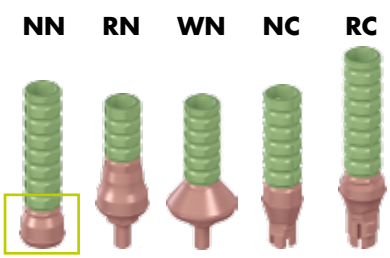
Surface

The wax-up of the customized abutment should have no burrs or chips and should have a clean, unpolished surface.

The screw channel does not have to be plugged with wax.

The wax-up should be fabricated from scannable wax (otherwise Aqua Spacer[1] scanning lacquer can be used).

Minimum body of Wax-up sleeves



The section above the implant shoulder represents the minimum body, and must not be ground (displayed red in the graphic to the left).

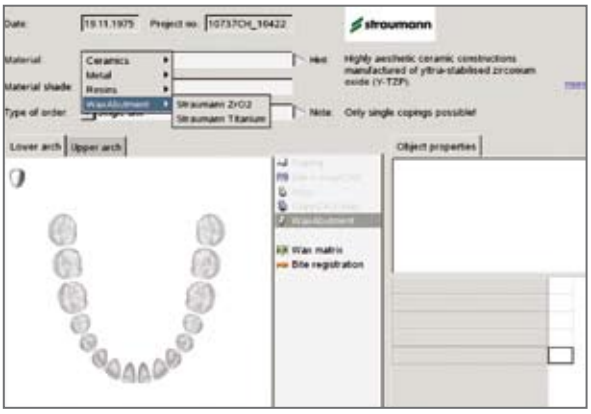
Only in the upper section can the Wax-up sleeve be reduced (displayed green in the graphic to the left).

Do not wax below the basal margin of the Wax-up sleeve (red arrow).

[1] Aqua Spacer is a brand of al dente, dentalprodukte, Dieselstrasse 20, 88074 Meckenbeuren, Germany

6.9.3.3 Scanning

Under **Project,** open **Create New Project**. Select a customer from your customer database, enter the reference of the patient and practitioner in the **New Project** window and click **OK**. The **Add Order** window will open.

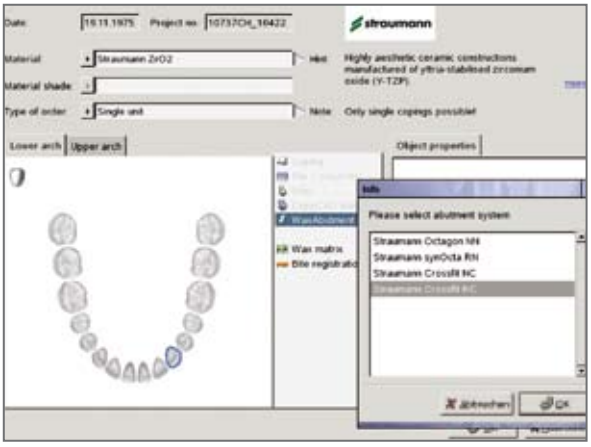


Note

You have to anonymize the patient data prior to sending as described in chapter 6.9.3.4. You must ensure traceability.

Select the required tooth in the maxilla or mandible in the order form. From the drop-down menu select **Material > WaxAbutment > Straumann® ZrO_2** or **Straumann® Titanium**.

Under **Tooth Types** click on **WaxAbutment** and select the appropriate implant platform.



The available platforms for the selected material are displayed.

Note

The position of the implant must be given.

Positioning the wax-up abutment in the scanner

- Fix the modified Wax-up sleeve on the corresponding Wax-up sleeve holder. Please note that for each implant platform the appropriate Wax-up sleeve and Wax-up sleeve holder must be used.
- Insert the Wax-up sleeve holder into the Adapter for sleeve holder. Make sure that the peg of the Wax-up sleeve holder is in line with the white marking on the Adapter for sleeve holder. Only then the Wax-up sleeve holder is correctly positioned and completely inside the Adapter for sleeve holder.
  Integrated magnets and a rotation lock help to position it correctly.
- Position the complete Adapter for sleeve holder in Scan cylinder 7 of the etkon™ es1 scanner.

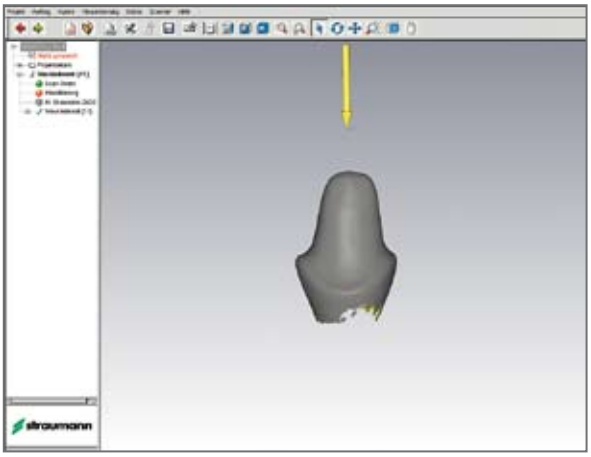
Notes

- The Wax-up sleeve must be correctly positioned on the Wax-up sleeve holder to ensure an accurate scan.
- When correctly positioned there is no rotation and no gap between the Wax-up sleeve and the Wax-up sleeve holder.
- To ensure an accurate fit Wax-up sleeves are intended for single use only.

Scanning

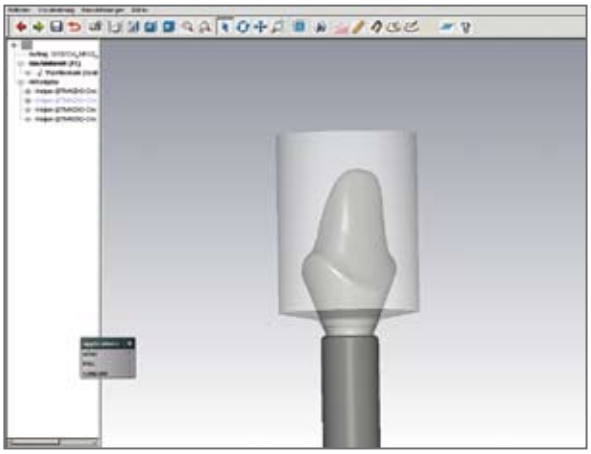
Make sure once again that there is no wax below the basal edge of the Wax-up sleeve and ensure that the wax-up is correctly positioned in Scan cylinder 7 as described above. Close the lid of the scanner and follow the instructions of the scan manager.

After the scan process, the 3D object will be displayed digitally.



Simplified process
In the simplified process only the minimum and maximum geometries are monitored. The design suggested by the etkon™_visual software is accepted. Small design changes can be made with the customizing tools.

Click on the green arrow to switch to the design mode. The software connects the preparation margin with the implant configuration. In the design mode the minimum and maximum geometries are automatically shown for checking.



Ensure that the abutment does not exceed the maximum dimensions.

Notes

- The minimum geometry is defined by the Wax-up sleeve. For this reason the lower section of the Wax-up sleeve must not be ground. It is also important to make sure that no wax has been placed below the basal edge of the Wax-up sleeve.
- Areas outside the displayed dimension cannot be fabricated.

The minimum and maximum geometries can be displayed and hidden separately.

The following customization tools can be used for minor design changes in the design mode:

- Individual segments can be built up with the **Wax-up tool**.

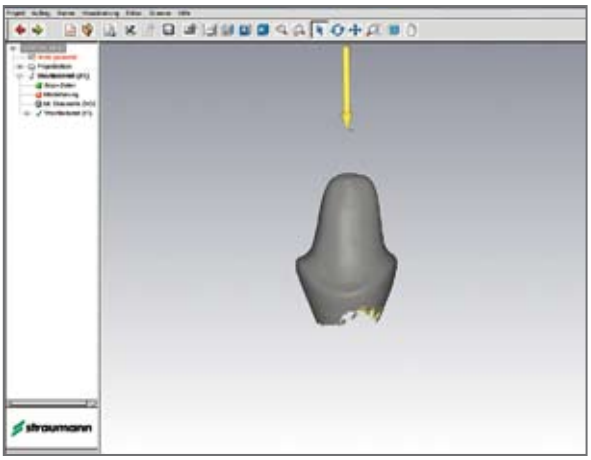
- The **Wax knife** can be used to shape the abutment individually.

- The **Smoothing tool** is used to smooth the abutment surface.

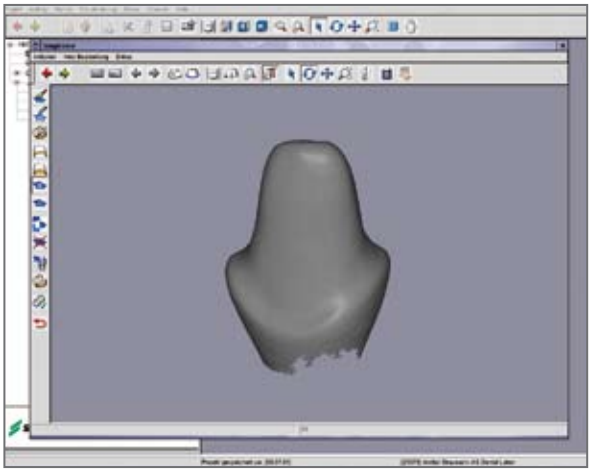
To finalize and order the object refer to the section "Finalizing the abutment" in this chapter.

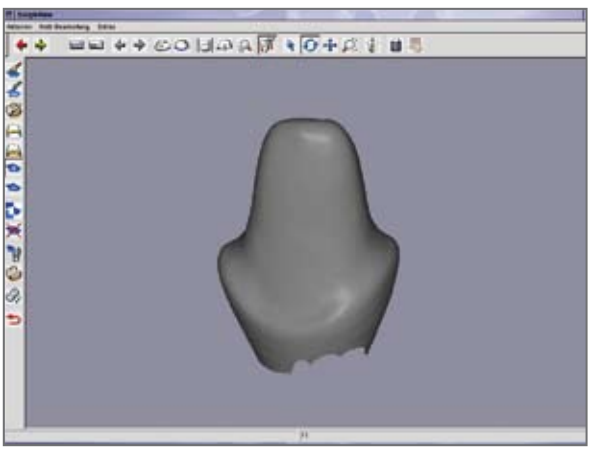
Advanced process
If the suggested design of the etkon™_visual software does not meet your requirements in the basal region, it can be processed in two different ways (Option A and Option B).

Load single object
Right click on **WaxAbutment** and then select **Load Single Object**.

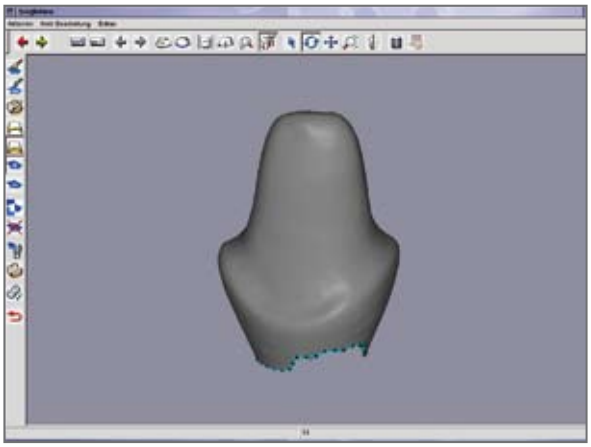


Option A – Automatic Definition of the preparation margins
If the software does not display a clean margin in the basal region of the abutment, the margin can be smoothed with the **Smooth margins** function (icon).

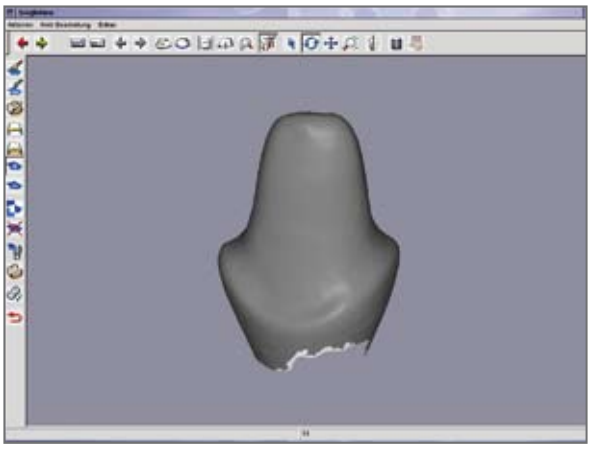




The function **Edit preparation line** (icon) is used to display the preparation margins. Now the exact position of every single point can be changed with the arrow keys.

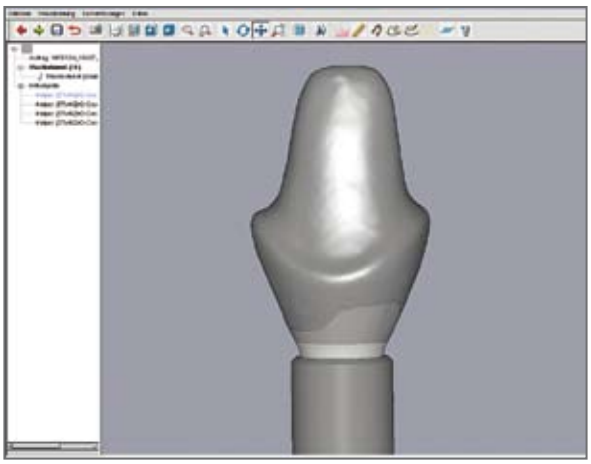


Click on the green arrow to accept the changes to the preparation margin.



Click on the green arrow again to change to design stage.

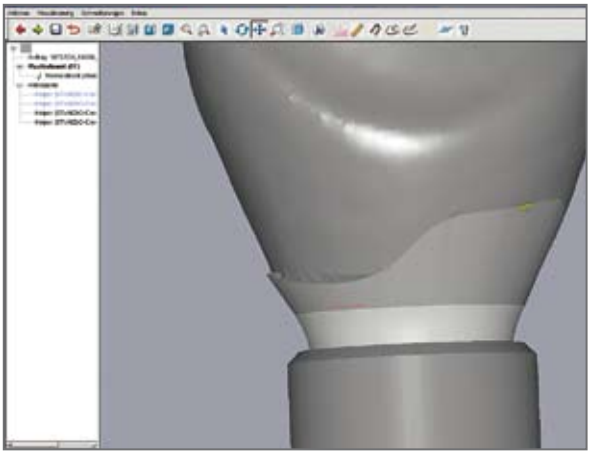
The software fills in the missing data points from the preparation margin down to the implant configuration (light-grey area in the illustration to the right).



Note

Even when the preparation is smoothed, the extrapolation of the missing data points may result in distortions, which will be reproduced on the surface of the milled abutment.

Manual definition of the preparation line is recommended for a clean surface in the basal region (Option B).



The following customization tools can be used for minor design changes in the design mode:

- Individual segments can be built up with the **Wax-up tool**.

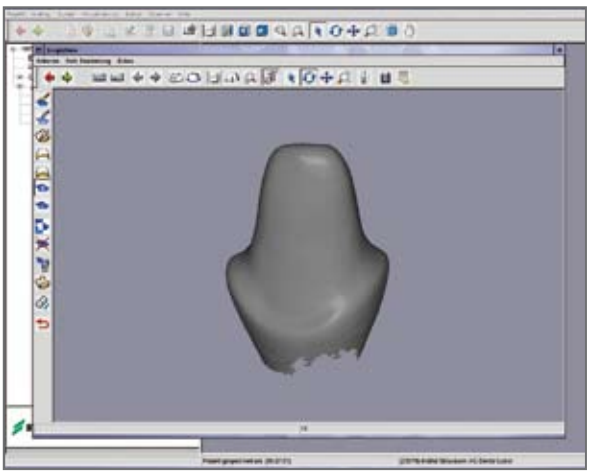
- The **Wax knife** can be used to shape the abutment individually.

- The **Smoothing tool** is used to smooth the abutment surface.

To finalize and order the object refer to the section "Finalizing the abutment" in this chapter.

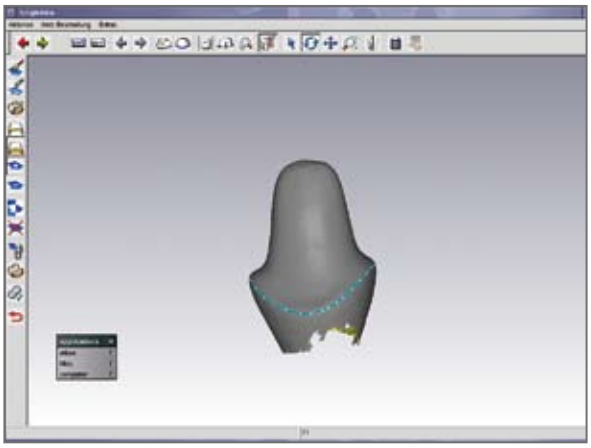
Option B – Manual definition of the preparation margins

If the software does not display a clean margin in the basal region of the abutment, the preparation margin can be defined with the **Create spline** function (icon).

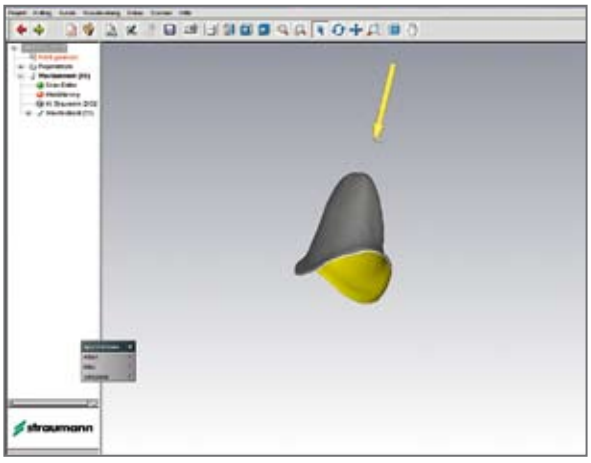


Place points along the preparation margin. The preparation line is closed with the last click on the start point.

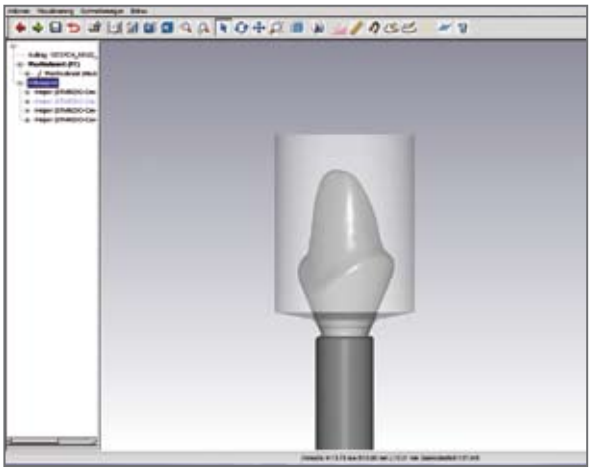
Now the exact position of every single point can be changed with the arrow keys.



Click on the green arrow to remove the basal region of the abutment.



Click on the green arrow to have the software calculate the missing data points from the manually defined preparation margin down to the implant configuration and display the abutment on the implant.



The following customization tools can be used for minor design changes in the design mode:

- Individual segments can be built up with the **Wax-up tool**.

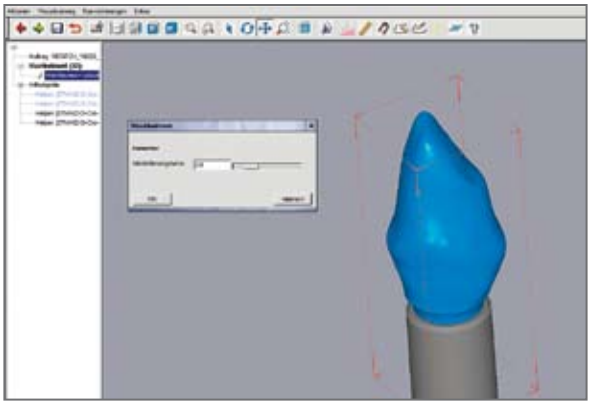
- The **Wax knife** can be used to shape the abutment individually.

- The **Smoothing tool** is used to smooth the abutment surface.

To finalize and order the object refer to the section "Finalizing the abutment" in this chapter.

Finalizing the abutment

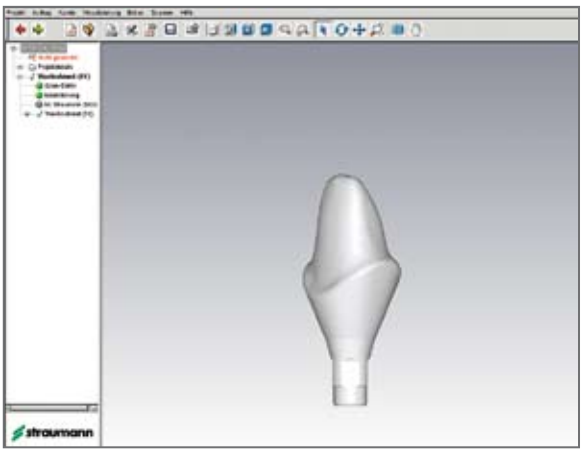
The modeling height of the wax abutment can be set to its optimum value in **Project Properties**.



Note

The following is recommended: Right-click on **wax Abutment**, then select **Object Properties > WaxAbutment > Design Height** and set it to **0.6 mm**.

Finalize the work by clicking on the **Next/finalize** icon (green arrow).

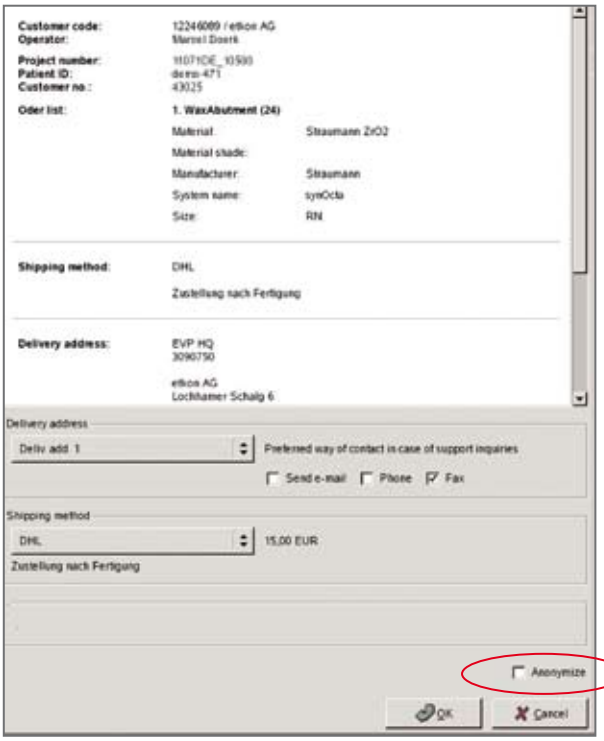


6.9.3.4 Ordering

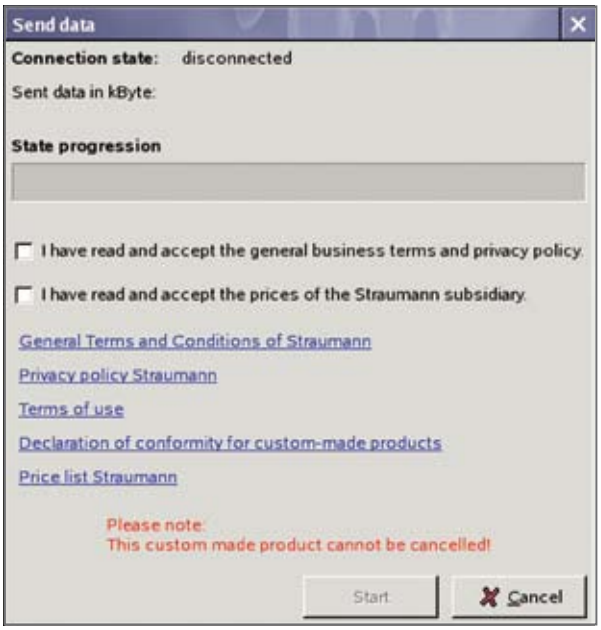
Choose your delivery address to send the order.

You must encode the patient reference by checking the check-box **Anonymize**.

Confirm with **OK**.



As the last step check the two checkboxes and click on **Start**.


Send data
Connection state: disconnected
Sent data in kByte:
State progression
I have read and accept the general business terms and privacy policy.
I have read and accept the prices of the Straumann subsidiary.
General Terms and Conditions of Straumann
Privacy policy Straumann
Terms of use
Declaration of conformity for custom-made products
Price list Straumann
Please note:
This custom made product cannot be cancelled!
Start
Cancel

Notes

General Terms and Conditions
The general terms and conditions must be accepted when confirming the order.

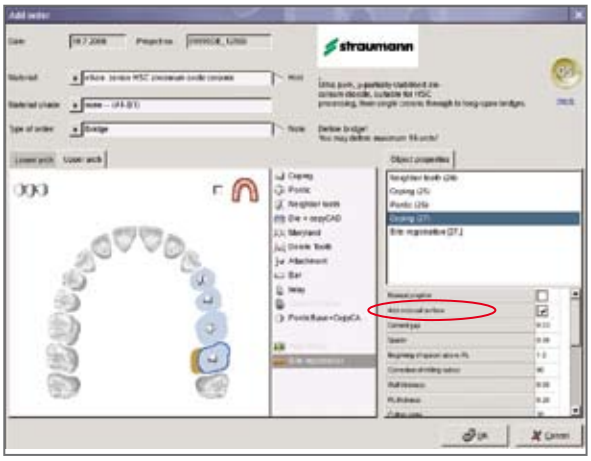
Prices
The prices for the Straumann® CADCAM abutments are available by clicking on the **Price list Straumann®** link.

In the Webshop you can check the current status of your order.

As soon as the order leaves the production center and is given to the courier, you will receive an e-mail message with an order tracking number to be used on the courier's website to follow the progress of your order.

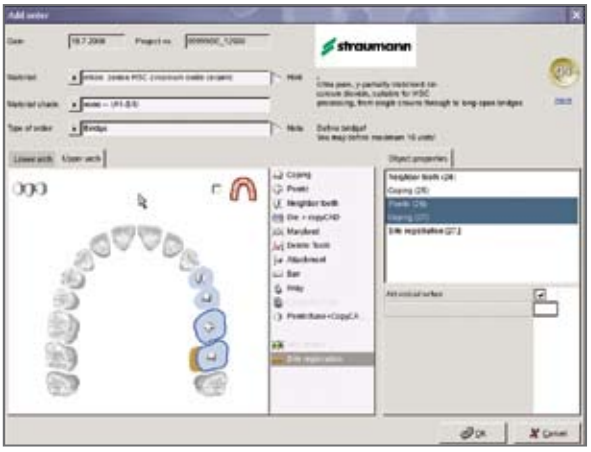
6.10 Occlusal surface database

The occlusal surface application of the patented artegral®[1] by the company Merz Dental is now available to the user. To design a fully anatomical occlusal surface mark a coping or a pontic when creating the order and additionally check **Attach occlusal surface** in the object properties.

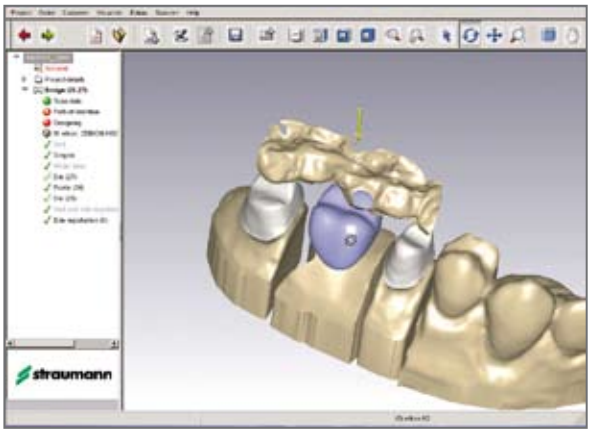


This function is also available for modeling by selecting the respective coping or pontic and activating.

Multiple selections of occlusal surfaces for copings and pontics are also possible.



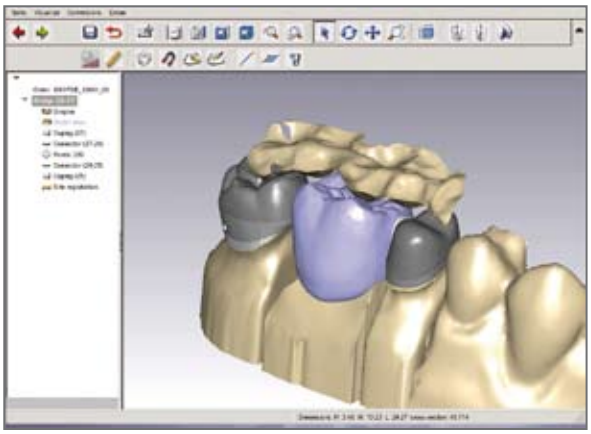
For an ideal design of the occlusal surface we recommend including one or more bite registrations as well as the adjacent teeth.



[1] artegral® is a registered trademark of Merz Dental GmbH, Lütjenburg

Initial suggestion

After the bite registration has been cut to size in single view and the path of insertion has been defined, the etkon™_visual software shows the initial design for the created order when you click on the green arrow.



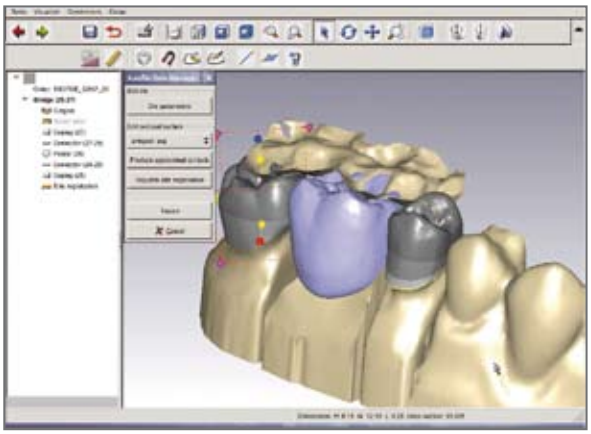
The tooth types selected in global settings are used here.

Designing

When modeling, single objects can be processed one after the other via the **Occlusal surface** button.

After activation of the **Occlusal surface manager** the following functions can be accessed:

- Adjustment of die parameters
- Selection of occlusal surface template
- Adjustment of approximal contacts with neighboring teeth (scanning of adjacent teeth is an advantage)
- Adjustment to bite registration
- Merging of the object



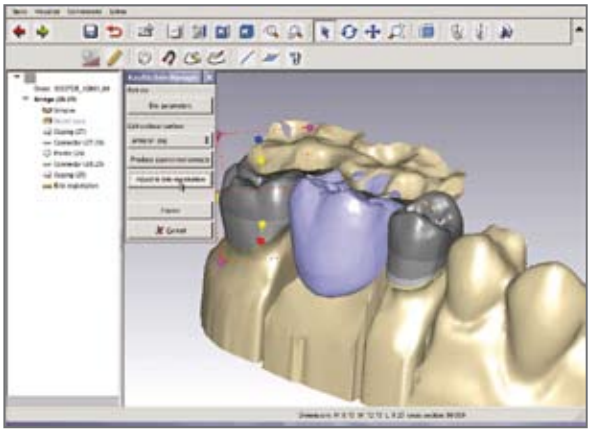
Additionally, the object can be moved and scaled via the familiar grippers of the bounding box.

The modeling tools (wax knife, Wax-up tool and smoothing tool) can also be used to modify the occlusal surfaces after leaving the **Occlusal surface manager.**

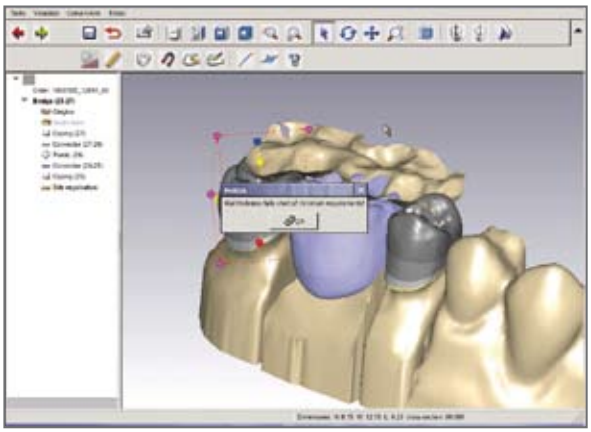
If no occlusal surfaces were selected when creating the order, these can be generated by highlighting the object and selecting the function **Occlusal surface**.

Adjust to bite registration function

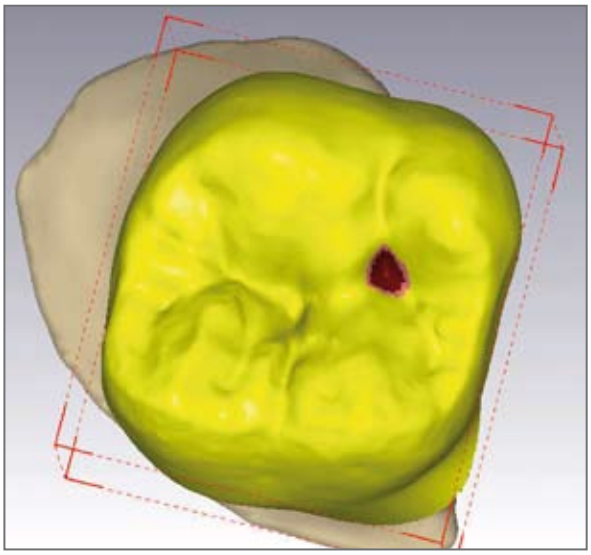
Position or design the occlusal surface so that the bite registration is penetrated by the occlusal surface on the required contact areas, and activate the **Adjust to bite registration** function. This adjusts the occlusal surfaces to the respective bite registration.



When the occlusal surface is reduced in accordance with the registration, the minimum wall thickness is checked for the first time.

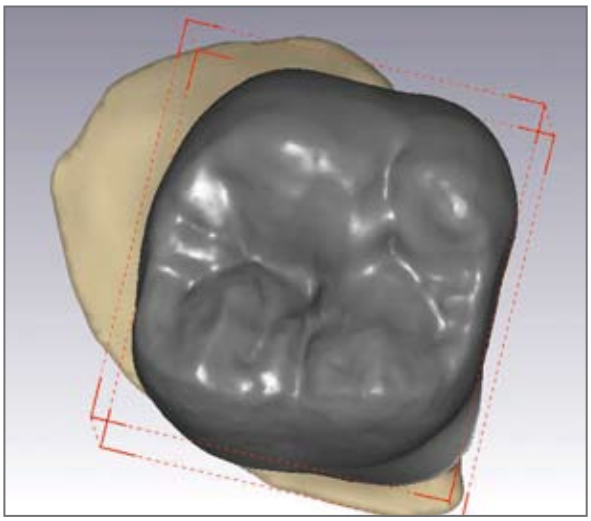


If the wall thickness falls below the minimum, the color of the object changes from standard grey into yellow. The critical areas are marked in red.



Note
It is not possible to continue without corrections.

These areas must be adjusted using the modeling tools. As soon as the defined minimum wall thickness is reached again, the color of the object changes back to gray.

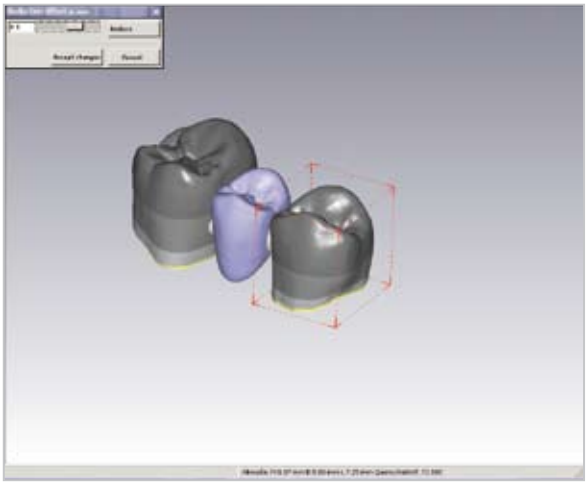


After all bridge units have been processed, the connectors must also be put into the required shape and position before the entire job can be finalized by clicking the green **Continue** arrow.

6.11 Occlusal surface reduction

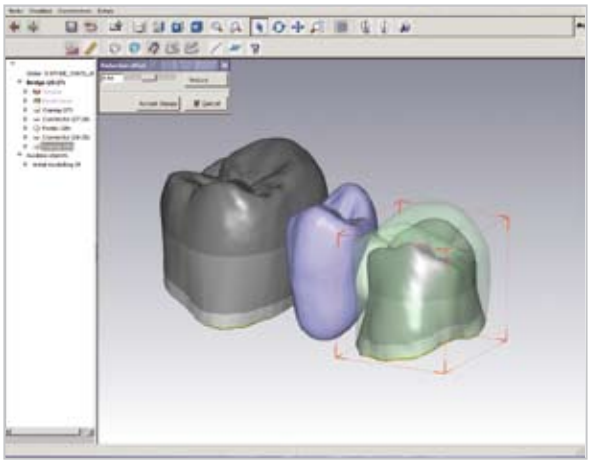
The additional button **Reduce occlusal surface** reduces the previously anatomically modelled occlusal surface of a coping, pontic or copyCAD.

After marking the object, the **Reduction manager** can be called via the function **Reduce occlusal surface**. Afterwards it is possible to set the level of reduction by means of a scroll bar (incremental value is 0.1 mm).



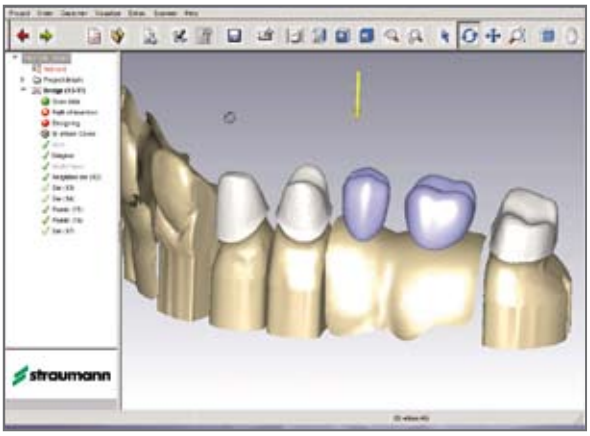
After the reduction level has been determined you can carry out this reduction via the button **Reduce**. The previous fully contoured design is still shown in the transparency mode. The reduction can be repeated several times until the required form has been reached.

Confirm the reduction via the button **Accept** to conclude the reduction process. The previous model then shown in the transparency mode can be hidden at any time via the feature tree. After the reduction you can use all familiar modeling tools.

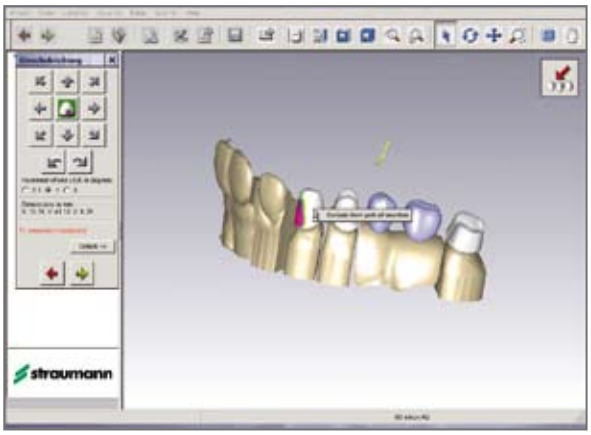


6.12 Design of undercut bridges

Single dies in a bridge can be excluded from the overall path of insertion as follows.

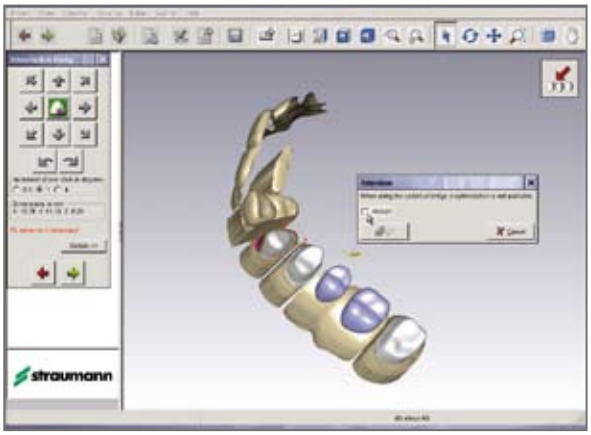


After scanning, change to **Path of insertion** as usual. The undercuts will be shown after the path of insertion has been evaluated. The example shows a situation where the divergent die 21 cannot be corrected via the overall path of insertion. Now select the die to be removed from the path of insertion, open the context menu with a right mouse click and select **Exclude from path of insertion**.

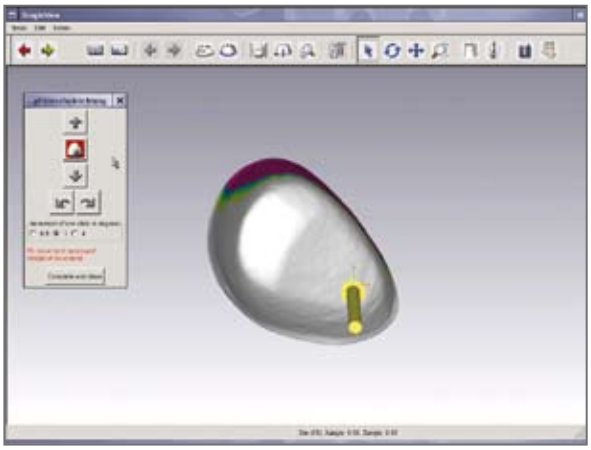


In the next step, confirm the query in the dialog box and finish the definition of the path of insertion as usual.

Correction of the undercuts of the excluded die is carried out in the next step.

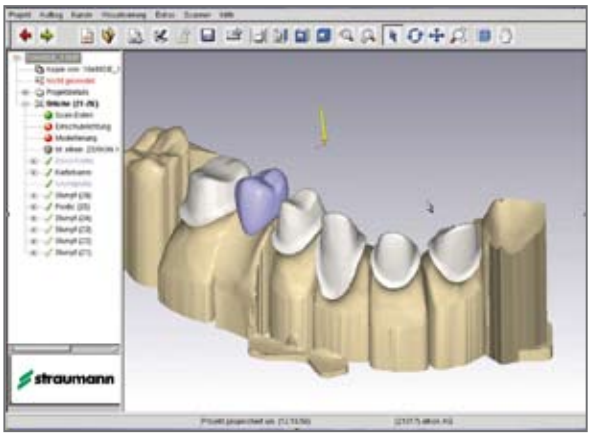


Continue by clicking on the green arrow and arrange the excluded die in its individual insertion direction. The maximum tilting amounts to ±10°.



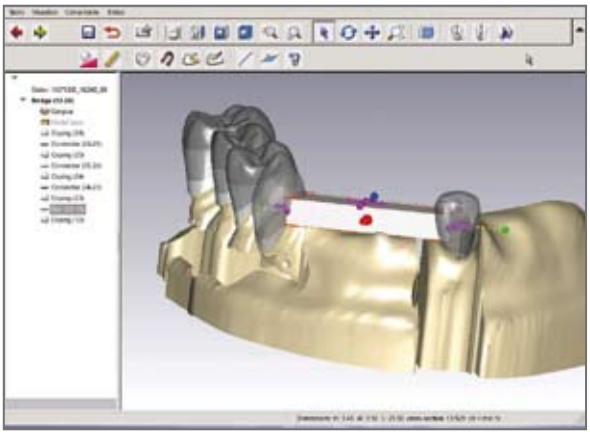
The separately arranged die will be indicated in the feature tree by an additional arrow on the die.

Designing the framework follows the usual process.

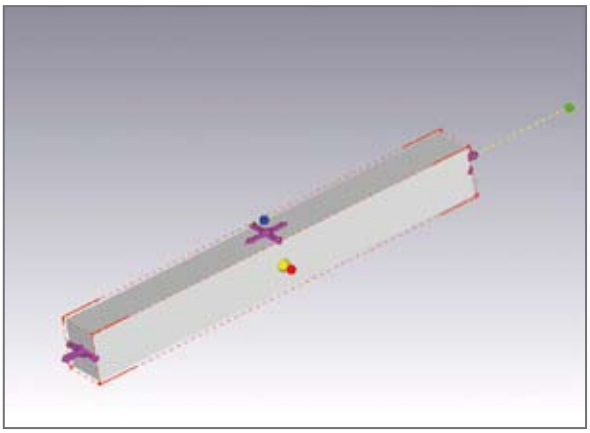


6.13 Bar function

To edit the shape and position of the bar, highlight the bar and use the grippers.



The following grippers are available:



Pink grippers with arrows
You can shape the bar either in horizontal or vertical direction using the pink grippers with arrows. To change the direction, please press the space bar. Active grippers are shown in red.

Yellow grippers
With these grippers you can change the height and width of the bar in a vertical or horizontal direction. Active grippers are shown in red.

Green, blue and red gripper
These grippers rotate the object around its respective axis.

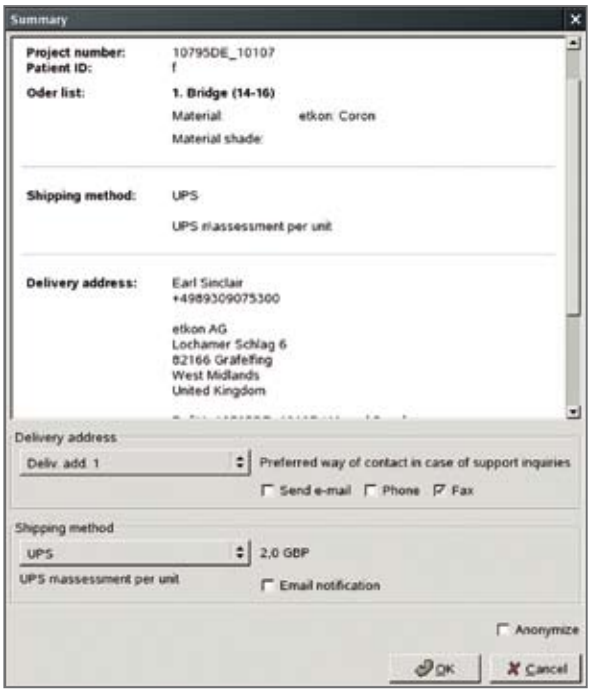
7. SENDING THE ORDER TO STRAUMANN CADCAM GMBH

After the design is finalized you can send the project to Straumann CADCAM GmbH via Straumann.

Step 1
Click on the **Next** arrow to send the data.

Step 2
Check all project data in the displayed summary and select the delivery address.

Note
Please enter your personal delivery address into **Deliv. add 1**.



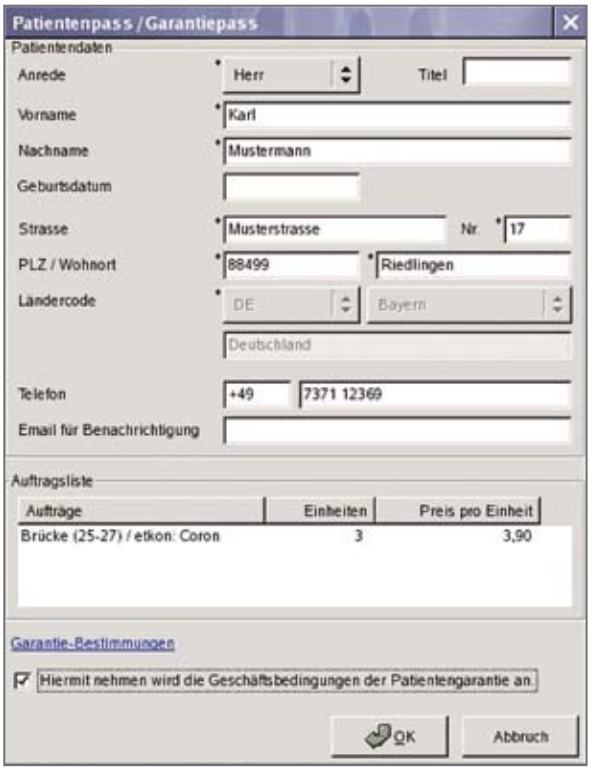
Step 3 – ONLY FOR GERMANY

Select between the extended patient guarantee Q5 of 5 years or the legal warranty of 2 years.
The Straumann guarantee Q5 includes reimbursement of the cost for new production including material, laboratory costs and dentist's fee.

Step 4 – ONLY FOR GERMANY

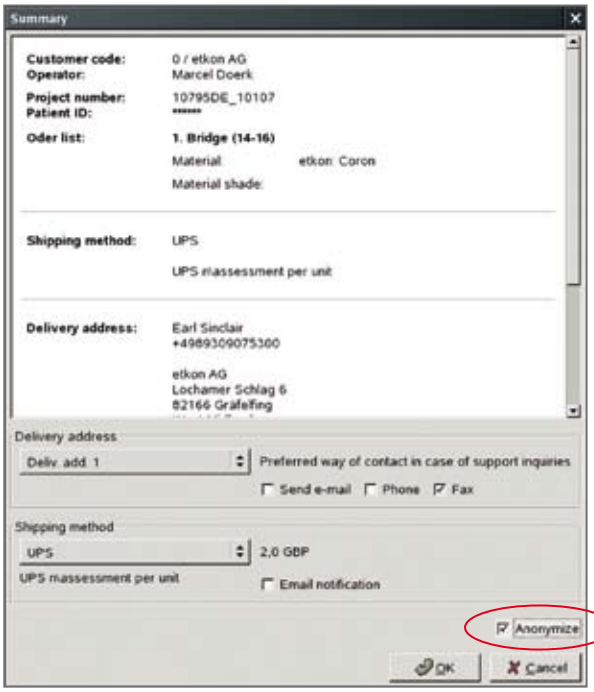
If you have selected the extended patient guarantee Q5, a further window opens automatically.
Here you must complete all boxes marked with an asterisk (mandatory boxes).
Completeness of the data is very important since these are forwarded directly to the ZAG Plus insurance company.
Accept the guarantee conditions and confirm your entry with **OK**.

Under the link **Guarantee conditions** you will find all information on the conditions for the guarantee, damage reporting and your rights of recourse.



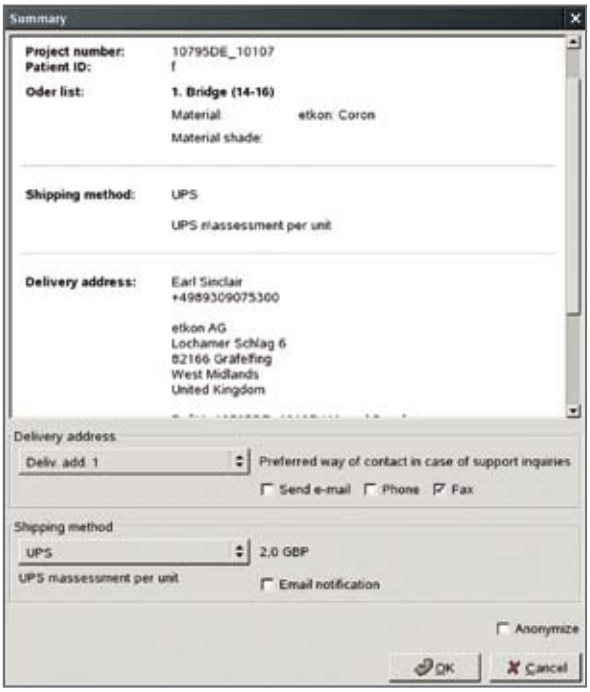
Step 5 – Anonymizing

You must encode the patient reference.



Step 6

Select a **Shipping method**.

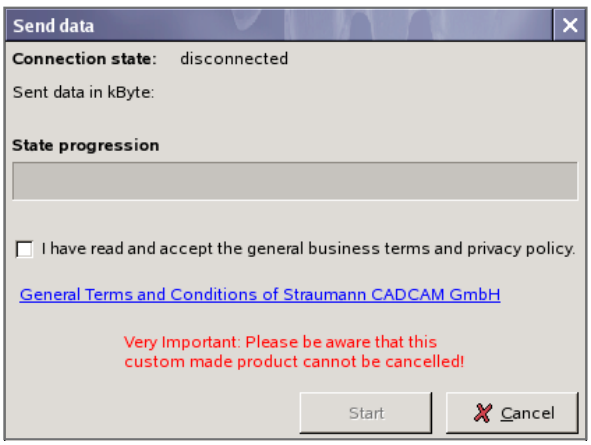


Step 7

Accept the general terms and conditions of Straumann® by checking the box.

General Terms and Conditions of Straumann® are available by clicking on the corresponding link.

Click on **Start**.

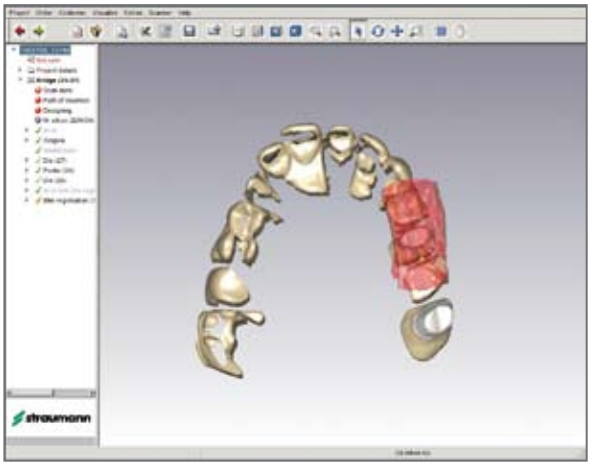

Send data
Connection state:
disconnected
Sent data in kByte:
State progression
I have read and accept the general business terms and privacy policy.
General Terms and Conditions of Straumann CADCAM GmbH
Very Important: Please be aware that this
custom made product cannot be cancelled!
Start
Cancel

8. PROBLEMS AND SOLUTIONS

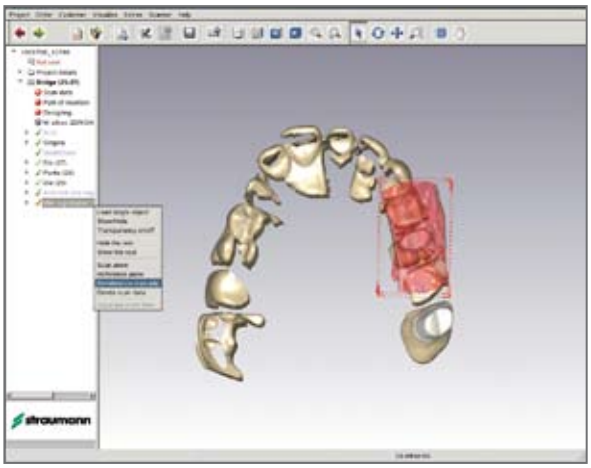
8.1 Non-referenced bite registrations or wax matrices

8.1.1 Manual matching of the jaw

If a yellow-red checkmark is in front of the **Arch with bite registration/wax matrix,** you can solve the problem as follows.



Step 1
Right click on **Arch with bite registration/wax matrix** and select **Rereference manually**.



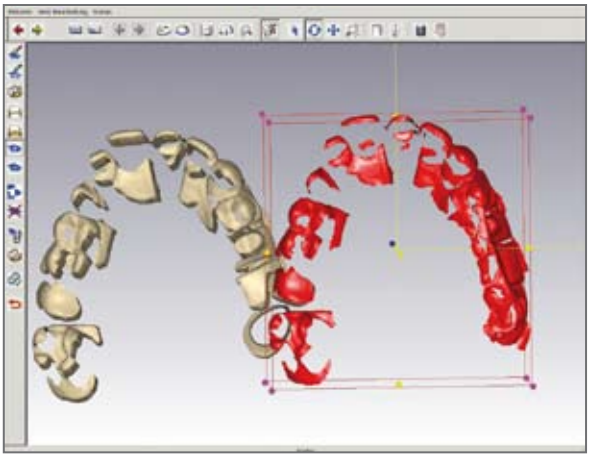
Step 2
In single view click on the **3-point match** icon on the left.

Step 3

Now define a triangle by placing three points in a similar arrangement.

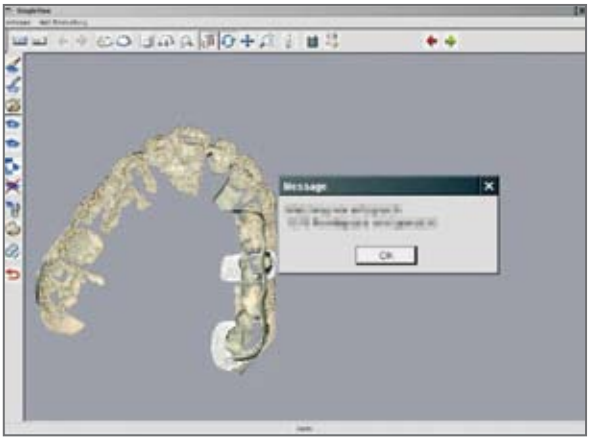
Choose three distinct spots you can easily recognize in both displays.

Start with the **Arch with bite** (in the highlighted box).



Step 4

Referencing is initiated automatically by setting the last point. A message follows telling you whether referencing was successful or nor.

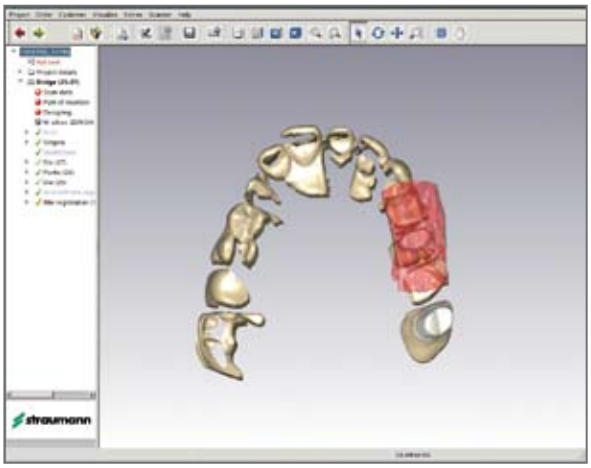


Note

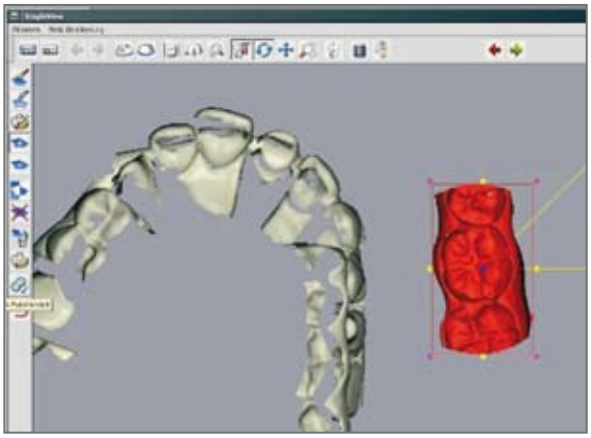
If referencing is not successful, you can also determine the position of the model manually and accept it with the **Next** icon.

8.1.2 Manual matching of the bite registration/wax matrix

If a yellow-red checkmark appears in front of the **Bite registration/wax matrix,** you can solve the problem as follows.



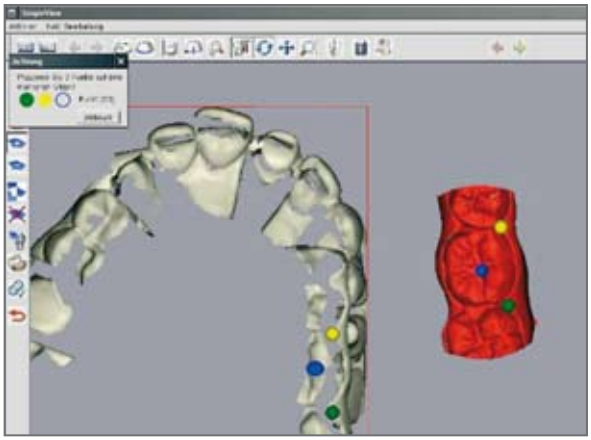
Step 1
Right click on **Bite registration/wax matrix** and select **Rereference manually**.



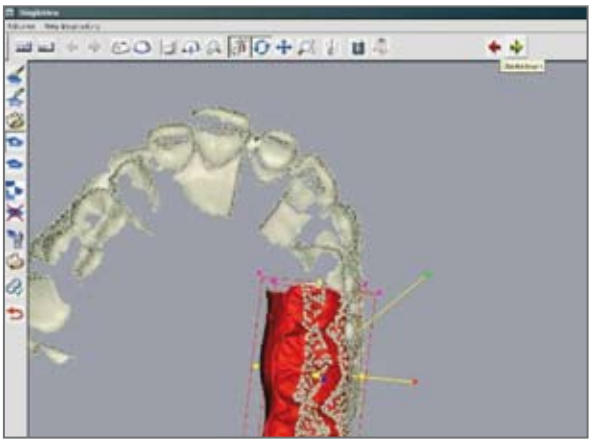
Step 2
In single view click on the **3-point match** icon on the left.

Step 3
Now define a triangle by placing three points in a similar arrangement.

Begin with the **Bite registration/wax matrix** (in the display bite on the right).



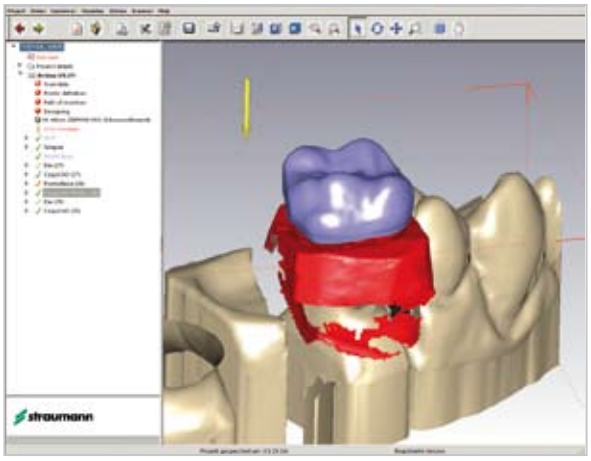
Step 4
Referencing is initiated automatically by setting the last point.



Note
If referencing is not successful, you can also determine the position of the bite registration manually and accept it with the **Next** icon.

8.1.3 Manual matching for CopyCAD Pontic Basis

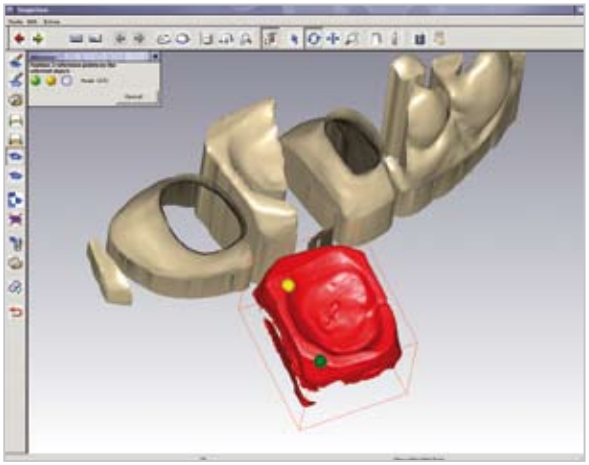
With the function **CopyCAD Pontic** you now have the possibility to undertake the positioning of the pontic basis via **Manual matching**, if the pontic basis was not matched automatically.



Note

This option can only be used for the indication **PonticBase+CopyCAD Pontic** and not for **Die + copyCAD**.

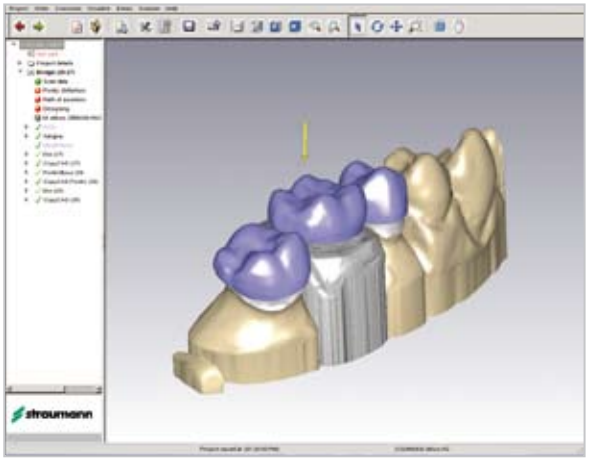
The process is analog to the already familiar matching. Open the context menu of the pontic base by a right click and select **Rereference manually**. After the activation of the function **3-point match** the three points, which should form a triangle if possible, are positioned on both objects and the automatic referencing is started.



Note

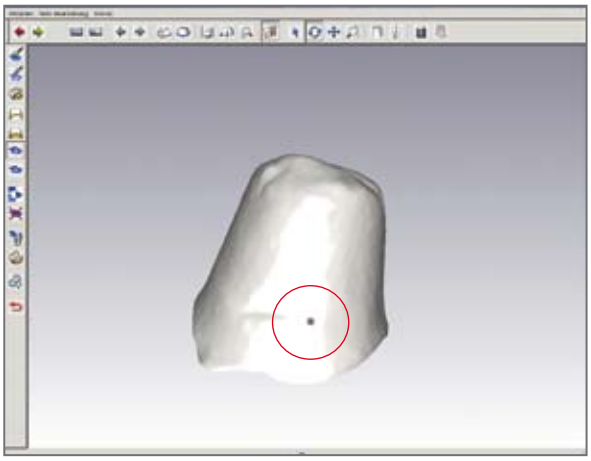
In the case of insufficient matching results you can undertake the positioning manually as usual.

After successful matching the respective object is checked with a green mark in the feature tree and you can continue with the process as usual.



8.2 Die with holes

Problem
After scanning, a hole is displayed in the die.



Solution
You can close the hole by proceeding as follows.

Step 1
Right click on the corresponding object in the feature tree and select **Load single object**.

Step 2
Click on the **Close holes** icon.

Step 3
Click on the **Next** icon.

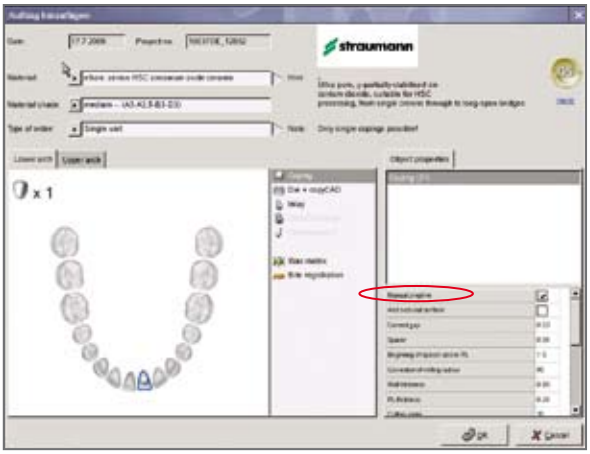
8.3 Manual determination of preparation lines for dies that cannot be chamfered sufficiently

Step 1
Select the corresponding tooth by clicking in the tooth diagram in the order dialog.

Select **Coping** as the tooth type.

To manually define the preparation line, click the corresponding box in the parameter list on the right.

If you right click on **Coping** this allows yout to select the manual preparation line definition. This is also possible in **Die + copyCAD** and **Primary crowns.**



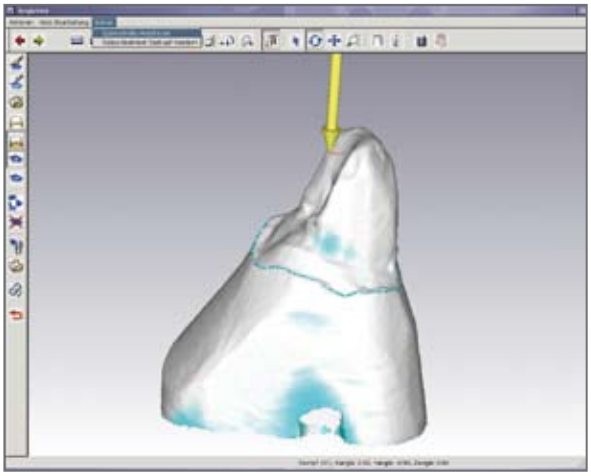
Step 2
After scanning click on the **Next** icon.

Step 3
First define a provisional path of insertion which displays undercut regions when setting the points (as described in chapter 5.4).

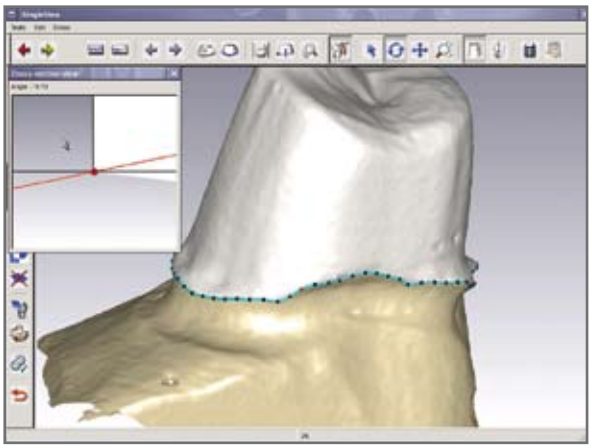
Step 4

Click on the **Create spline** icon.

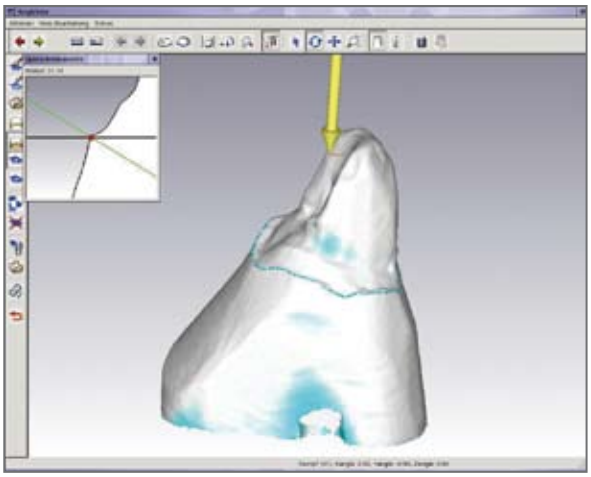
- Set points along the preparation line.
- For corrections delete the last set point by right clicking.
- The preparation line is closed with the last click on the start point.
- You can still edit the exact position of each individual point.
- You can move the point higher or lower with the vertical arrow keys.
- You can go to the next point with the horizontal arrow keys.
- A 2D sectional image of the current view is available for precise determination of the preparation line.
- You can activate or deactivate the function optionally via the **Extras > Cross-sectional view on** menu.



The green straight line of a point shows that this point is not in the undercut area. If the straight line turns red the point lies in the undercut of the tooth.



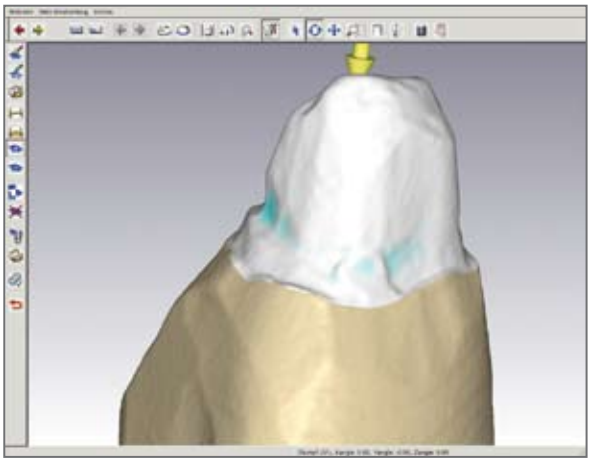
To add further points on the line, click on the **+** sign.
To remove a point, click on the **–** sign.



Step 5
Click on the **Next** icon.

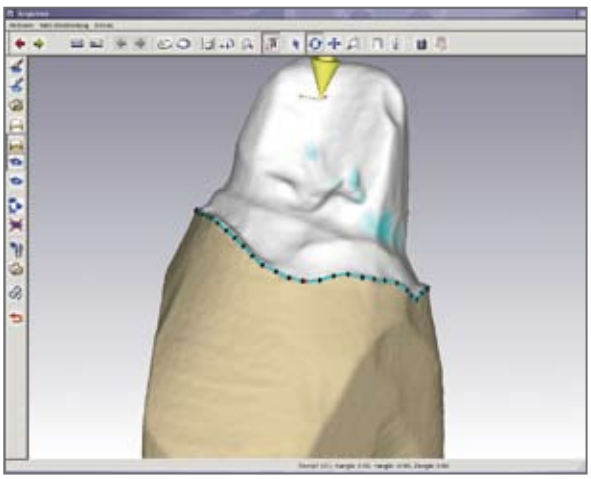
8.4 Manual editing of preparation lines for dies that are chamfered underneath

If the preparation line was not chamfered sufficiently underneath for automatic line detection, this can be corrected in the single view.



Click on the **Edit preparation line** icon.

- The preparation line is now displayed accordingly.
- You can still change the position of each point.
- You can move the point higher or lower with the vertical arrow keys.
- You can go to the next point with the horizontal arrow keys.
- To add further points on the line click on the **+** sign.
- To remove a point click on the **–** sign.



To accept the changes of the preparation line, click on the **Next** icon.

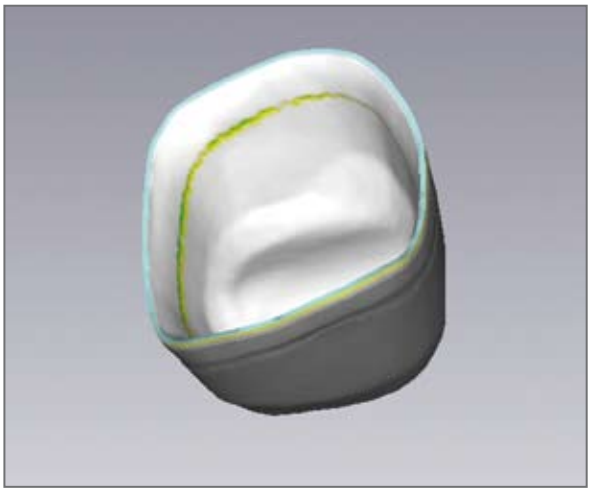
8.5 Display of parameter-induced undercuts inside the crown

With parallel walled dies there can be a slight undercut that cannot be milled due to application of the virtual die spacer.

This is now also displayed graphically in the design stage inside the crown.

As you already know from determining the path of insertion, the corresponding color states the amount of the undercut.

The display serves solely for visualizing these areas, and can help as reference when adapting the framework.

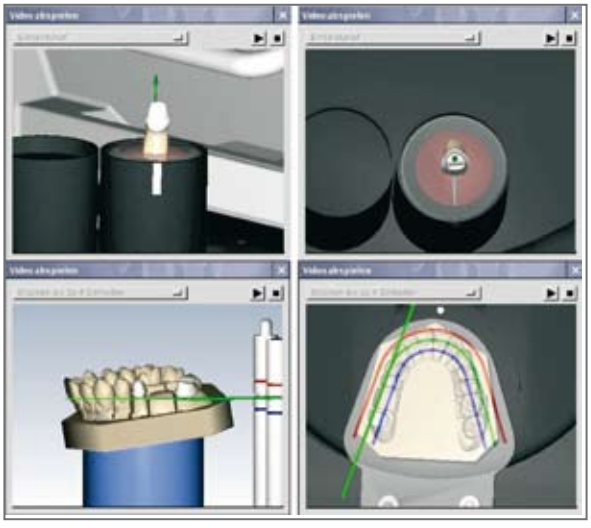


8.6 Help video

By clicking on **MPEG2 Play** in the Scan Manager you can view a small video that shows you how to align a die or a model in the scanner.

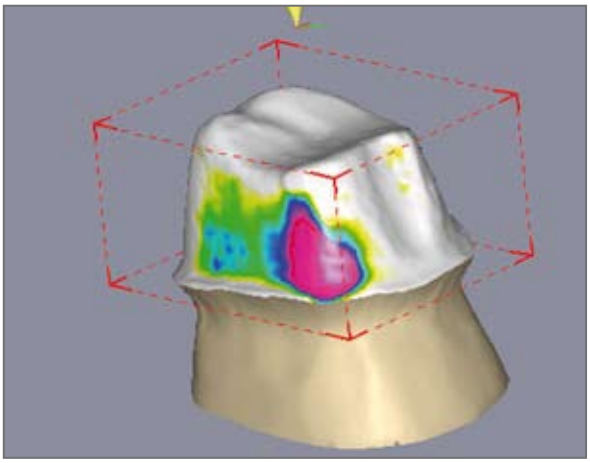
Alternatively, you can also view the videos without going into the Scan Manager.

Click on **Help** in the menu bar and select **Help videos**.



8.7 Flashing of the bounding box on dies with undercuts greater than 10 µm

If in the definition of the path of insertion an undercut leading to open margins is created, the bounding box around the corresponding die flashes.



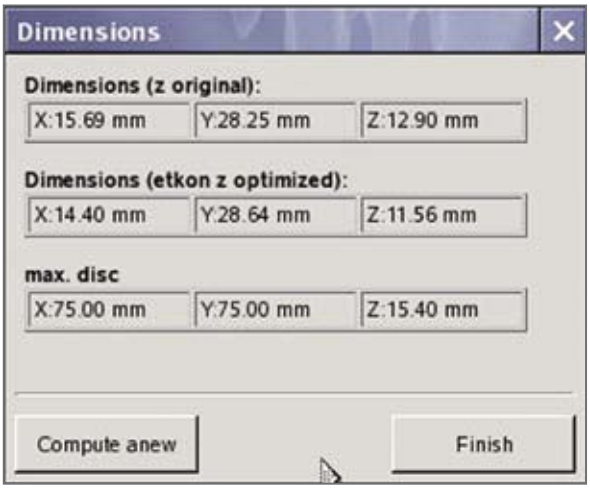
8.8 Construction dimensions function

To check whether the designed work fits in the available blanks, use the **Construction dimensions** function.

You can now check the positioning in the blank and correct the design if necessary.

Automatic Z optimization
Even bridges with a very flat path of insertion can be produced with the automatic Z optimization.

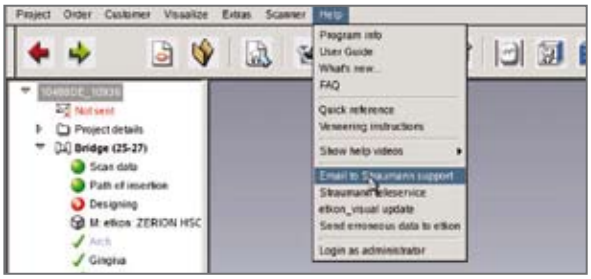
The bridge is **aligned optimally** in the blank by **Z optimization**.



9. SERVICE AND SUPPORT

9.1 Sending e-mail to Straumann® support

You can contact our support through the **Help** menu.



To simplify communication with our support team, contact your local support team via **Help > E-mail to Straumann® support**.

Note
To use this feature an e-mail account needs to be accessible on your computer.

9.2 Contacting Straumann® teleservice

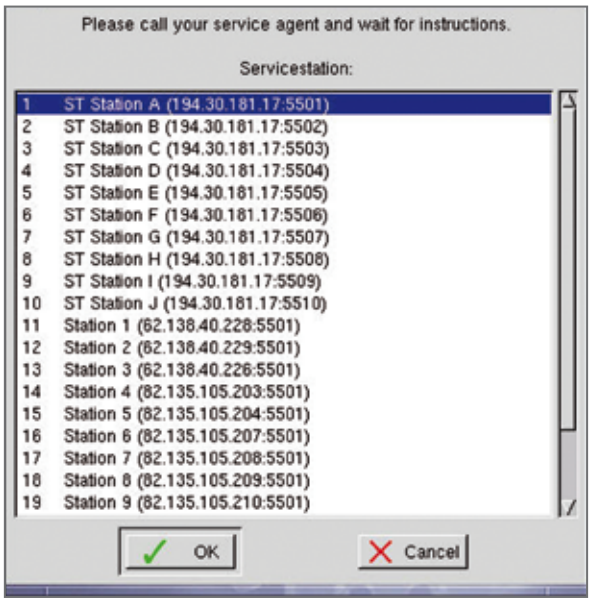
Step 1

1. In the etkon™_visual menu bar select **Help > Straumann® teleservice**. The following window is displayed.

2. Click on **Yes**. The following dialog is displayed.

Step 2

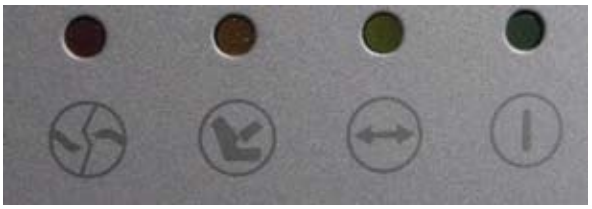
Contact your local Straumann® support by phone and follow the instructions.



9.3 Status of the LED displays on the es1 scanner

Status LED 1

- After a prolonged lighting phase there is no communication between scanner and etkon™_visual (not initialized).
- Flashing LED: the scanner is in standby mode.



Status LED 2

- LED is orange: scanner lid is open.

Status LED 3

- LED is yellow: scanner is in motion and should not be opened.

Status LED 4

- LED is green: scanner has been booted and is now ready.

9.4 Error codes

Error code	Cause	Solution
ERR_COMM = -1	▪ Communication error	▪ Contact technical support
ERR_MATCHING = -2	▪ Error in referencing partial views ▪ Video cable is not connected ▪ Object is inserted in the wrong Scan cylinder	▪ Check alignment of the die in the Scan cylinder ▪ Check correct connection of video cable
ERR_REFERENCE_NOT_FOUND = -3	▪ Die not found in the data stock ▪ Model positioned too high for scanning ▪ Deviation between model scan and die alignment during the single scan is too big	▪ Check alignment of the die in the Scan cylinder and restart scan
ERR_FILE_NOT_FOUND = -4	▪ File error	▪ Contact technical support
ERR_NOMEM = -5	▪ Insufficient hard disk memory	▪ Save older projects on CD-ROM and then delete them from the hard disk ▪ Delete older projects from the hard disk ▪ Contact technical support
ERR_ALREADY_RUNNING = -6	▪ etkon™_visual was started twice	▪ Restart scan ▪ Contact technical support
ERR_AXIS_MOVE = -7	▪ Scanner was opened during scanning	▪ Restart scan
ERR_FILE_SAVE = -8	▪ File error	▪ Contact technical support
ERR_STOPPED = -9	▪ Scan interrupted by user	▪ Restart scan
ERR_PREPARATION = -10	▪ Preparation line was not recognized	▪ Die must be undercut more clearly ▪ Check alignment of the die in the scan cylinder
ERR_DOORSWITCH = -11	▪ Scanner lid open	▪ Close scanner lid and restart scan
ERR_ENDSWITCH = -12	▪ Scanner axis has moved to limit switch	▪ Contact technical support
ERR_EMERGENGY_STOP = - 13	▪ Scanner was opened during scanning ▪ Scan interrupted by user	▪ Close scanner lid ▪ Restart scan
ERR_USERBREAK = -14	▪ Scan interrupted by user	▪ Restart scan
ERR_MOVE_TIMEOUT = -15	▪ Maximum intended waiting time exceeded (timeout)	▪ Contact technical support

Error code	Cause	Solution
ERR_LOW_POWER_STATE = -16	▪ Scanner in standby mode	▪ Switch the scanner off and on again ▪ Check status of the LED lights (see status overview)
ERR_AXIS_NOT_REFERENCED = -17	▪ Axes could not be referenced ▪ Scanner was opened during calibration	▪ Switch the scanner off and on again ▪ Restart scan
ERR_NO_ANSWER = -18	▪ Scanner switched off ▪ Scanner not connected with the computer	▪ Connect scanner to functioning power supply ▪ Check cable connections ▪ Check status of the LED lights (see status overview)
ERR_UNKNOWN_ANSWER = -19	▪ Scanner has received unknown command	▪ Contact technical support
ERR_GENERIC_ERROR = -20		▪ Contact technical support

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